THE FISHES
OF THE
INDO-AUSTRALIAN ARCHIPELAGO

VIII

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THE FISHES OF THE INDO-AUSTRALIAN ARCHIPELAGO
1940

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VIII

PERCOMORPHI (CONTINUED)
CIRRHITOIDEA, LABRIFORMES,
POMACENTRIFORMES

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C. 2

with 56 illustrations

BY

Dr. L. F. DE BEAUFORT

Professor at the University and Director of the Zoological Museum
of Amsterdam

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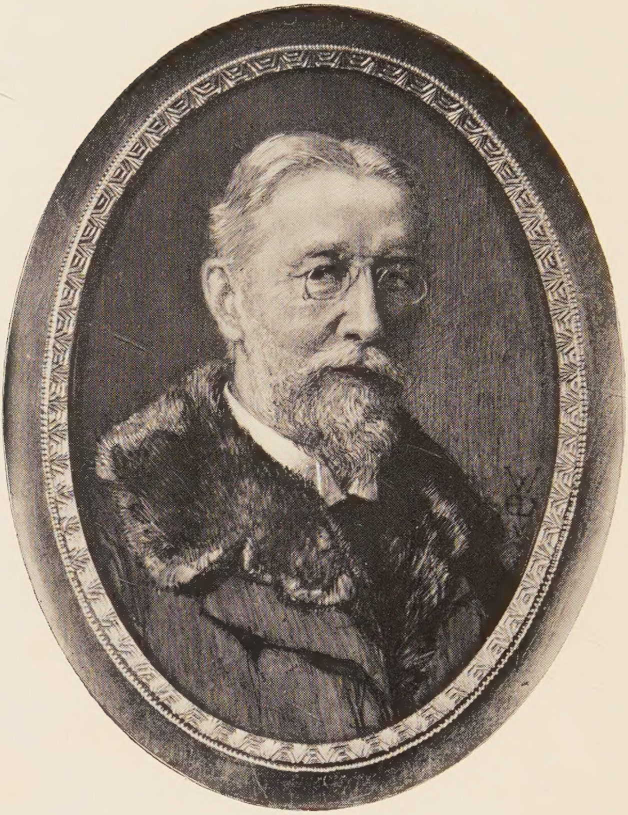

Max Weber.

5. XII. 1852—7. II. 1937

After a miniature by Mrs. E. L. H. Woutersen-van Doesburgh
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TO THE MEMORY

OF

MAX WILHELM CARL WEBER

who planned this work on the Indo-australian Fishes, and who devoted more than twenty-five years of his long and laborious life to its advancement,

THIS VOLUME IS DEDICATED

by the junior author, who is thankful for the cordial friendship bestowed on him and for the many pleasant hours of his company while working in the laboratory and at the writing-desk.

INTRODUCTION

This volume, the eighth of the series, is the first in which the senior author, my friend MAX WEBER, could not collaborate anymore.

Shortly after the issue of the seventh volume his health began to fail, and on Febr. 7. 1937 his long life, spent in the service of science, came to an end.

Up to the last his interest in this series remained, and he even started the study of the *Cirrhitoidea* for the coming volume, but got not farther than preliminary research, leaving to me the continuation of the work which we started together.

This task will be facilitated in so far as even during WEBER's life we secured the collaboration of Dr. F. P. KOUMANS, Curator of Fishes in the Leiden Museum. As is well known among ichthyologists, Dr. KOUMANS specialized in the Gobies. A grant of the PIETER LANGERHUIZEN LAMBRECHTUSZOON Foundation enabled him to visit the principal zoological museums of the world to study the types of Indo-Pacific *Gobioidea,* and a volume on the members of this difficult group from the Indo-australian Archipelago will be issued in due time.

In the present volume the Sub-order *Percoidea* is continued with the 2nd Division *Cirrhitoidea,* the 3rd *Labriformes,* and the 4th *Pomacentriformes.* The study of the species of the two last-named divisions offers difficulties as many species are chiefly based on the colour pattern which fades through preservation. Moreover, the young ones differ often from the adults in their colouring, and this has led many authors to describe these juvenile stages as separate species.

A great help to me has been the work of FOWLER & BEAN on the Labrids and Pomacentrids collected by the Albatross in the Philippines and adjacent waters. This very rich collection, which contains large series of several species which hitherto were only known from a single specimen, enabled the authors to settle many questions.

No less useful has been the large collection of Labrids and Scarids from the Philippines, which the Bureau of Science, Manila, sent me for identification. I thank Mr. WILLIAM H. BROWN, and Mr. A. S. ARGUELLES, Directors of the Bureau of Science, for the liberal way in which they put these collections at my disposition, and allowed me to keep duplicates for the Amsterdam Museum.

I also had the great advantage of studying the collections made by Dr. J. VERWEY during his assistantship at the "Laboratorium voor het Onderzoek der Zee", Batavia, on the reefs in the Bay of Batavia.

The present Director, Dr. J. D. F. HARDENBERG too has always been ready to help me with information and with the sending of specimens I asked for. I express my gratitude to these two gentlemen for their help and the interest they took in my work.

I thank Prof. Dr. H. BOSCHMA, Director, and Dr. F. P. KOUMANS, Curator of the Leiden Museum for their hospitality when visiting the Leiden Museum for the study of BLEEKER's collection.

My thanks are also due to Mr. J. R. NORMAN who often gave me information about specimens in the British Museum, and who kindly allowed me to study several rare species during a visit to London.

I also wish to thank Prof. Dr. P. PAPPENHEIM for information about specimens in the Berlin Museum and Mr. G. P. WHITLEY of the Australian Museum, Sydney, who helped me to elucidate the status of *Platyglossus margaritaceus* Macleay, which turned out to belong to a new genus.

I thank also Dr. HENRY FOWLER, who gave me details about the identification of Scarids from the Bay of Batavia, sent to him by Dr. VERWEY.

It has been necessary to change the names of several well-known species and of one genus, but in all cases it was clear, that even when adopting the International Rules of Nomenclature as mildly as possible, the alterations had to be made. Two of them were a consequence of the fact, that a paper of LÖNNBERG, who studied the types of LINNÉ in the Museum of Upsala, has been overlooked by later authors, and the third, the wrong application of the name *Leptoscarus,* is the result of a series of mistakes, made by several prominent ichthyologists. It is the fate of the systematist to spend much of his time retrieving and correcting the mistakes made by previous authors, knowing all the time that he too is probably making new ones.

As has been done in the former volumes I reprint here the information given in the introduction of the second volume, about the way in which measurements have been taken.

"In describing the fishes we understand by *Length,* in the discussion of the proportions, the distance between the snout and the base of the caudal fin; in giving the largest size known for a species, we include the caudal fin.

The *Head* is measured from the tip of the snout to the end of the opercle, its proportion to the length is indicated e.g. as follows: head 4—4½ means, that the length of the head is contained 4 to 4½ times in the length.

Height is the maximum height; in special cases it is indicated how it is measured; the figures placed behind “height” indicate how many times it is contained in the length.

The size of the “*Eye*”, the length of the “*Snout*”, of the “*Jaws*”, etc. are compared with the length of the head; thus “eye 4” means, that its diameter is ¼ of the length of the head.

In counting the *Scales,* under “L.l.” is given the number of scales, with or without sensory organs, between the head and the caudal fin or, in most cases, between that fin and the upper corner of the opercle.

L. tr. $\frac{3\frac{1}{2}}{6\ (7)}$ signifies, that there are 3½ rows of scales between the dorsal fin and the lateral line and 6 to 7 below it, the lateral line itself is not counted in this case. In other cases the lateral line itself is also counted f.i.

L. tr. $\begin{array}{c}4\frac{1}{2}\\ \hline 1\\ \hline 1\end{array}$ (between D. and V.), which signifies, that there are 4½ rows of scales between the dorsal fin and the lateral line, one in the lateral line itself and one between it and the ventral fin.

In the *Fin formulae* the spines and the simple, non-branched rays are generally indicated by a figure, separated by a point from that of the number of the branched rays.

The last soft ray of the dorsal and anal, in case it is cleft to the base and therefore counted as two by some authors (Bleeker e.g.) is reckoned as one, being supported by a single pterygophore.

The *Gillmembranes* may be totally free from each other and from the isthmus; they may be united, but still remain free from the isthmus; or they may be connected with the isthmus and with each other; when in the last case the posterior border of the united gillmembranes is not quite adnate to the isthmus, there remains a free posterior margin, running as a fold over the isthmus from one gillopening to the other.”

In conclusion, I found it necessary to give the *relation between the length and height of the head,* as it gives information in such compressed forms as the Labrids and the Pomacentrids about the profile of this part of the fish. I have measured the height in the vertical through the uppermost part of the hindborder of the preopercle. In most cases this hindborder is vertical or nearly so, when the mouth is closed, and hence the measurement can be taken along the hindborder itself.

The figures in this volume are again the work of that able artist Mr. J. F. OBBES; only two drawings had to be copied from other papers.

I have to thank Miss A. P. C. DE VOS, adjunct assistant of the Zoological Museum, Amsterdam, for reading the proofs and for the most unpleasant task of compiling the index.

Finally my thanks are due to Mr. TH. FOLKERS, Director of the publishing and printing firm E. J. BRILL Ltd. of Leiden, for his help and care while publishing this volume.

Amsterdam, September 1940. L. F. DE BEAUFORT

SYSTEMATIC INDEX

page
Order PERCOMORPHI (continued) 1

I. Suborder **Percoidea** (continued). 1

2. Division CIRRHITOIDEA . . 1

1. Fam. CIRRHITIDAE 1
  1. *Cirrhitus* Lacepède . . . 2
    1. pinnulatus (Bl. Schn.) . 2
  2. *Paracirrhites* Bleeker . . 5
    1. forsteri (Bl. Schn.) . . 5
    2. arcatus (C.V.) 7
  3. *Cirrhitichthys* Bleeker . . 9
    1. aprinus (C.V.) 9
    2. polyactis Blkr. 12
  4. *Oxycirrhites* Bleeker . . . 13
    1. bimacula (Jenkins) . . 14
    2. typus Blkr. 15

3. Division LABRIFORMES . . . 16

1. Fam. LABRIDAE 16
  1. *Cirrhilabrus* Schlegel . . . 20
    1. solorensis Blkr. 21
    2. temmincki Blkr. . . . 22
    3. cyanopleura (Blkr.) . . 23
  2. *Pseudodax* Bleeker . . . 25
    1. moluccanus (C.V.) . . 25
  3. *Xiphocheilus* Bleeker . . . 26
    1. typus Blkr. 27
    2. quadrimaculatus Gthr. . 29
  4. *Choerodon* Bleeker . . . 30
    1. anchorago (Bl.) . . . 31
    2. schoenleini (C.V.) . . 34

page
    3. margaritiferus Fowler & Bean 36
    4. zosterophorus (Blkr.) . 36
    5. melanostigma Fowler & Bean 38
    6. vitta Ogilby 38
    7. oligacanthus (Blkr.) . . 39
  5. *Bodianus* Bloch 41
    1. mesothorax (Bl. Schn.) 42
    2. diana (Lac.) 44
    3. anthioides (Benn.) . . . 46
    4. bilunulatus (Lac.) . . . 47
    5. oxycephalus (Blkr.) . . 48
  6. *Parabodianus* n.g. 50
    1. rutteni n. sp. 51
  7. *Cymolutes* Günther . . . 51
    1. lecluse (Q. G.) 52
  8. *Hemipteronotus* Lacepède . 53
    1. twisti (Blkr.) 55
    2. stockumi (Reuvens) . . 56
    3. pentadactylus (L.) . . . 57
    4. melanopus (Blkr.) . . . 58
    5. celebicus (Blkr.) . . . 60
    6. aneitensis (Gthr.) . . . 62
  9. *Iniistius* Gill 62
    1. pavo (C.V.) 63
  10 *Xyrichthys* Cuvier 65
    1. javanicus (Blkr.) . . . 65
  11. *Novaculichthys* Bleeker . . 66
    1. macrolepidotus (Bl.) . . 67
    2. taeniurus (Lac.) . . . 69
    3. bifer (Lay & Bennett) . 71
  12. *Epibulus* Cuvier 72
    1. insidiator (Pallas) . . . 73

page
13. *Cheilinus* Lacepède 74
  1. chlorurus (Bl.) 76
  2. oxycephalus Blkr. . . . 78
  3. trilobatus Lac. 79
  4. fasciatus (Bl.) 81
  5. undulatus Rüpp. . . . 83
  6. bimaculatus C.V. . . . 84
  7. mentalis Rüpp. 86
  8. diagramma (Lac.) . . . 88
  9. rhodochrous Gthr. . . . 90
  10. oxyrhynchus Blkr. . . . 91
  11. arenatus C.V. 93
  12. celebicus Blkr. 94
14. *Pseudocheilinus* Bleeker . 96
  1. hexataenia (Blkr.) . . 97
15. *Anampses* (Cuvier) Quoy & Gaimard 98
  1. geographicus C.V. . . 99
  2. pterophthalmus Blkr. . . 101
  3. meleagrides C.V. . . . 102
  4. melanurus Blkr. 103
  5. amboinensis Blkr. . . . 103
  6. diadematus Rüpp. . . . 104
  7. caeruleopunctatus Rüpp. 105
  8. neoguinaicus Blkr. . . . 107
  9. twistii Blkr. 107
16. *Cheilio* Lacepède 108
  1. inermis (Forsk.) . . . 109
17. *Gomphosus* Lacepède . . . 111
  1. tricolor Q. G. 112
  2. coeruleus Lac. 113
  3. varius Lac. 114
18. *Thalassoma* Swainson . . 117
  1. janseni (Blkr.) 119
  2. schwanefeldi (Blkr.) . . 121
  3. hardwicki (Benn.) . . . 122
  4. umbrostigma (Rüpp.) . 125
  5. purpureum (Forsk.) . . 127
  6. fuscum (Lac.) 129
  7. güntheri (Blkr.) . . . 130
  8. cupido (Schl.) 132
  9. lunare (L.) 133
  10. amblycephalus (Blkr.) . 136
  11. melanochir (Blkr.) . . . 137

Doubtful species

  1. genivittatus (C. V.) . . 138
19. *Duymaeria* Bleeker . . . 139
  1. flagellifera (C.V.) . . 140
20. *Hemigymnus* Günther . . 142
  1. fasciatus (Bl.) 143
  2. melapterus (Bl.) . . . 145
21. *Labroides* Bleeker 147
  1. dimidiatus (C.V.) . . . 148
  2. bicolor Fowler & Bean 150
22. *Diproctacanthus* Bleeker . 151
  1. xanthurus (Blkr.) . . . 151
23. *Labrichthys* Bleeker . . . 152
  1. cyanotaenia Blkr. . . 153
24. *Stethojulis* Günther . . . 155
  1. trilineata (Bl. Schn.) . 156
  2. renardi (Blkr.) 158
  3. albovittata (Bonn.) . . 159
  4. interrupta (Blkr.) . . . 161
  5. strigiventer (Benn.) . . 163
  6. phekadopleura (Blkr.) . 164
  7. kalosoma (Blkr.) . . . 165
  8. axillaris (Q. G.) . . . 167
25. *Xenojulis* De Beaufort . . 169
  1. margaritaceus (Macleay) 170
26. *Macropharyngodon* Bleeker 171
  1. meleagris (C.V.) . . . 172
27. *Pseudojulis* Bleeker . . . 173
  1. girardi (Blkr.) 174
  2. trifasciatus M. Weber . 175
28. *Halichoeres* Rüppell . . . 175
  1. cyanopleura (Blkr.) . . 183
  2. trimaculatus (Q. G.) . . 184
  3. scapularis (Benn.) . . . 186
  4. notophthalmus (Blkr.) . 188
  5. centiquadrus (Lac.) . . 189
  6. leucurus (Walb.) . . . 192
  7. kallochroma (Blkr.) . . 193
  8. richmondi Fowler & Bean 195
  9. melanurus (Blkr.) . . . 195
  10. marginatus (Rüpp.) . . 197
  11. notopsis (C.V.) 199
  12. vroliki (Blkr.) 201
  13. hoeveni (Blkr.) 202
  14. solorensis (Blkr.) . . . 204
  15. bicolor (Bl. Schn.) . . 205

page
16. nigrescens (Bl. Schn.) . 207
17. papilionaceus (C.V.) . . 209
18. xanti (Karoli) 210
19. leparensis (Blkr.) . . . 211
20. binotopsis (Blkr.) . . . 213
21. miniatus (C.V.) . . . 214
22. margaritaceus (C.V.) . 216
23. nebulosus (C.V.) . . . 218
24. hyrtli (Blkr.) 220
25. prosopeion (Blkr.) . . 222
26. amboinensis (Blkr.) . . 223
27. pardaleocephalus (Blkr.) 223
28. kneri Blkr. 224
29. timorensis (Blkr.) . . . 225
30. kawarin (Blkr.) . . . 227
31. dayi (Steind.) 228
32. hartzfeldi (Blkr.) . . . 228
33. argus (Bl. Schn.) . . . 230
34. chloropterus (Bl.) . . 233
35. gymnocephalus (Bl. Schn.) 234
36. javanicus (Blkr.) . . . 236
37. podostigma (Blkr.) . . 237
Doubtful species
Platyglossus bivittatus (Bl.) 238
29. *Pseudocoris* Bleeker . . . 238
1. heteropterus (Blkr.) . . 239
30. *Coris* Lacepède 241
1. gaimardi (Q. G.) . . . 242
2. greenovii (Benn.) . . . 246
3. aygula Lac. 247
4. variegata (Rüpp.) . . . 249
5. caudimacula (Q. G.) . . 251
31. *Hologymnosus* Lacepède . 252
1. semidiscus (Lac.) . . . 253
2. Fam. SCARIDAE 255
1. *Leptoscarus* Swainson . . 256
1. vaigiensis (Q. G.) . . . 257
2. coeruleopunctatus (Rüpp.) 259
2. *Cryptotomus* Cope . . . 260
1. spinidens (Q. G.) . . . 262
3. *Callyodon* (Gronovius) Bloch Schneider 265
1. bicolor (Rüpp.) 272

page
2. microrhinus (Blkr.) . . 273
3. strongylocephalus (Blkr.) 274
4. microcheilus (Blkr.) . . 275
5. harid (Forsk.) 276
6. pulchellus (Rüpp.) . . 277
7. zonatus (Macl.) 278
8. ophthalmistius (Herre) . 279
9. singaporensis (Blkr.) . . 280
10. janthochir (Blkr.) . . 281
11. vermiculatus Fowler & Bean 282
12. nuchipunctatus (C.V.) . 283
13. xanthopleura (Blkr.) . 285
14. pectoralis (C.V.) . . . 286
15. macleayi Jord. & Seale 288
16. muricatus (C.V.) . . . 288
17. dimidiatus (Blkr.) . . . 289
18. frenatus (Lac.) . . . 290
19. javanicus (Blkr.) . . . 292
20. hypselopterus (Blkr.) . 293
21. forsteni (Blkr.) . . . 294
22. tricolor (Blkr.) 295
23. rubroviolaceus (Blkr.) . 296
24. verweyi n. sp. 298
25. papuensis (Macleay) . . 299
26. viridibusius Fowler & Bean 299
27. moresbyensis (Macleay). 300
28. dubius (Benn.) 300
29. oviceps (C.V.) 302
30. macrocheilus (Blkr.) . . 303
31. ghobban (Forsk.) . . . 304
32. fasciatus (C.V.) 306
33. dussumieri (C.V.) . . . 308
34. blochi (C.V.) 309
35. sordidus (Forsk.) . . . 311
36. margaritus (Cart.) . . 313
37. oktodon (Blkr.) . . . 314
38. rhoduropterus (Blkr.) . 315
39. cyanotaenia (Blkr.) . . 316
40. erythrodon (C.V.) . . . 316
41. bleekeri nom. novum. . 318
42. bowersi Snyder . . . 319
43. mutabilis Gray 320
44. moensi (Blkr.) . . . 322
45. bataviensis (Blkr.) . . 323

page
46. forsteri (C.V.) 325
4. Division POMACENTRIFORMES . 326
1. Fam. POMACENTRIDAE . . . 326
1. *Premnas* Cuvier 327
1. biaculeatus (Bl.) . . . 329
2. *Amphiprion* Bloch Schneider 330
1. perideraion Blkr. . . . 332
2. akallopisus Blkr. . . . 333
3. ephippium (Bl.) . . . 334
4. melanopus Blkr. . . . 337
5. bicinctus Rüpp. . . . 338
6. polymnus (L.) . . . 342
7. sebae Blkr. 344
8. percula (Lac.) 345
Doubtful species
1. rosenbergi Blkr. . . . 348
3. *Daya* Bleeker 348
1. jerdoni (Day) 349
4. *Cheiloprion* M. Weber . . 350
1. labiatus (Day) . . . 351
5. *Pomacentrus* Lacepède . . 352
1. lividus (Bl. Schn.) . . 356
2. nigricans (Lac.) . . . 357
3. cyanomos Blkr. . . . 360
4. taeniurus Blkr. . . . 361
5. violascens (Blkr.) . . . 362
6. philippinus Evermann & Seale 363
7. littoralis C.V. 364
8. smithi Fowler & Bean . 366
9. bifasciatus Blkr. . . . 367
10. annulatus Peters . . . 368
11. breviceps (Schl. & Müller) 368
12. perspicillatus C.V. . . 370
13. prosopotaenia Bleeker . 372
14. fasciatus C.V. 373
15. chrysopoecilus Schl. & Müller 375
16. notophthalmus Blkr. . . 377
17. stigma Fowler & Bean. 379
18. melanochir Blkr. . . . 379
19. melanopterus Blkr. . . 380
20. nigromanus M. Weber . 381

page
21. moluccensis Blkr. . . . 382
22. reidi Fowler & Bean . . 384
23. pavo (Bl.) 385
24. amboinensis Blkr. . . 387
25. tripunctatus C.V. . . . 388
Doubtful species
1. rhodonotus Blkr. . . . 392
2. rectifraenum Gill . . . 393
6. *Abudefduf* Forskål . . . 393
1. sordidus (Forsk.) . . 399
2. septemfasciatus (C.V.) . 401
3. bengalensis (Bl.) . . . 403
4. saxatilis vaigiensis (Q. G.) 404
5. notatus (Day) 408
6. coelestinus (C.V.) . . . 409
7. bankieri (Rich.) . . . 411
8. anabatoides (Blkr.) . . 412
9. curacao (Bl.) 414
10. leucogaster (Blkr.) . . 416
11. aureus (C.V.) 418
12. filifer M. Web. 419
13. thoracotaeniatus Fowler & Bean 420
14. bonang (Blkr.) 420
15. melanopus (Blkr.) . . 422
16. behni (Blkr.) 422
17. melas (C.V.) 424
18. azysron (Blkr.) 425
19. oxycephalus (Blkr.) . . 426
20. xanthonotus (Blkr.) . . 426
21. oxyodon (Blkr.) . . . 428
22. plagiometopon (Blkr.) . 428
23. hemicyaneus M. Web. . 430
24. assimilis (Gthr.) . . . 431
25. cyaneus (Q. G.) . . . 432
26. bleekeri Fowler & Bean . 433
27. xanthozona (Blkr.) . . 434
28. biocellatus (Q. G.) . . 436
29. lacrymatus (Q. G.) . . . 439
30. leucozona (Blkr.) . . . 440
31. dickii (Liénard) . . . 442
32. albofasciatus Hombr. & Jacq. 443
33. batjanensis (Blkr.) . . 444

page
34. bimaculatus (Macl.) . . 445
Doubtful species
1. azureopunctatus Fowler & Bean 445
2. pallidus (De Vis) . . . 446
7. *Acanthochromis* Gill . . . 446
1. polyacanthus (Blkr.) . . 447
8. *Chromis* Cuvier 448
1. lepidolepis Blkr. . . . 450
2. caeruleus (C.V.) . . . 451
3. desmostigma Fowler & Bean 453
4. analis (C.V.) 454
5. xanthochir (Blkr.) . . 455

page
6. xanthurus (Blkr.) . . . 456
7. cinerascens (C.V.) . . . 457
8. ternatensis (Blkr.) . . 458
9. dimidiatus (Klunz.) . . 460
10. retrofasciatus M. Web. . 461
9. *Dascyllus* Cuvier 461
1. trimaculatus (Rüpp.) . . 463
2. marginatus (Rüpp.) . . 465
3. aruanus (L.) 467
4. melanurus Blkr. . . . 469
10. *Lepidozygus* Günther . . 470
1. tapeinosoma (Blkr.) . . 471
11. *Zabulon* Whitley 471
1. roseus (Gthr.) 472

Order PERCOMORPHI (continued)

I. Suborder **Percoidea** (continued)

2. Division CIRRHITOIDEA

Body more or less compressed, oblong or somewhat elongate, covered with cycloid scales. Lateral line complete, continuous, nearly straight. Spinous dorsal well developed. Three anal spines. Pectorals with the lower 5 to 8 rays simple. Ventrals rather far behind the pectorals, each of a spine and 5 branched rays, without scaly axillary process. Premaxillaries with ascending pedicels of moderate or great length. Maxillary ramus expanded distally, without supramaxillary. Three to six branchiostegals. Four gills. Pseudobranchiae present. Preopercle subcrescentic; operculum rather deep, with the free posterior edge more or less concave between two obtuse or acute prominences; subopercle long and narrow, projecting beyond opercle. Lower pharyngeals separate. Jaws with bands of teeth. Teeth on vomer generally present, sometimes also on palatines.

1. Family CIRRHITIDAE

Simple rays of pectorals more or less thickened and produced. Mouth terminal, protractile. Villiform teeth in jaws and on vomer, sometimes also on palatines. Premaxillary rami with posterior expansions, the maxillaries exposed, broadest distally. A broad subocular shelf. Dorsal with X spines and 11—17 rays. Anal with III spines and 6—9 rays. Perforated scales of lateral line almost covered by the scales of the longitudinal rows above and below it.

Distribution. Tropical and subtropical parts of Indic and Pacific.

Key to the Indo-australian genera of Cirrhitidae

1. Scales on cheeks small, in about 20 transverse rows. Interopercle with small scales . . . . . 1. *Cirrhitus* p. 2.
2. Scales on cheeks large, in about 3—5 transverse rows.
   a. Snout obtuse or slightly pointed. Symphysis of upper jaw far below level of lower border of eye.

a′. Interopercle with small scales. No teeth on palatines. Posterior border of preopercle crenulated . . . . 2. *Paracirrhites* p. 5.

b′. Interopercle with large scales, in about 2 rows. Teeth on palatines. Posterior border of preopercle strongly denticulated . . . . 3. *Cirrhitichthys* p. 9.

b. Snout much pointed. Symphysis of upper jaw about in the level of lower border of eye. No teeth on palatines. Posterior border of preopercle denticulated . . . . 4. *Oxycirrhites* p. 13.

1. **Cirrhitus** Lacepède

(Lacepède, Hist. Nat. Poissons V, 1803, p. 2)
Cirrhites Cuvier & Valenciennes, Hist. Nat. Poissons III, 1829, p. 66 (partim)

Elongate, rather compressed. Snout obtuse, the mouth far below level of eye. Body covered with moderate scales. Head scaly, excepting snout. Scales on cheeks and on inter- and subopercle small, those of opercle large, but the anterior ones small. Strong canines in the upper and lower jaw, besides villiform teeth. Teeth on vomer and generally also on palatines. Dorsal with X spines and 11 (12) soft rays. Anal with III spines and 6 (7) rays. Pectoral with 7 simple rays. Caudal truncate or slightly rounded. Gillmembranes united, free from isthmus.

Distribution that of the single species known.

1. **Cirrhitus pinnulatus** (Bl. Schn.) (Fig. 1, p. 3)

Labrus pinnulatus Bloch, Schneider, Systema Ichthyol. 1801, p. 264.
Labrus marmoratus Lacepède, Hist. Nat. Poissons III, 1802, p. 438.
Cirrhitus maculatus Lacepède, ibid. V, 1803, p. 2.
Cirrhitus maculosus Rüppell, Atlas Reise Nördl. Afrika. Fische, 1828, p. 13.
Cirrhites maculatus Cuvier & Valenciennes, Hist. Nat. Poissons III, 1829, p. 69.
Labrus pinnulatus Lichtenstein, Descr. Animalium 1844, p. 186.
Cirrhitichthys marmoratus Bleeker, Act. Soc. Sc. Indo-Neerl. VIII, 1860. Achtste bijdrage vischf. Sumatra, p. 76.
Cirrhitichthys maculatus Günther, Cat. Brit. Mus. II, 1860, p. 74.
Cirrhitichthys maculatus Klunzinger, Verh. zool. bot. Ges. Wien XX, 1870, p. 798.
Cirrhites maculatus Günther, Fische der Südsee I, 1873—1875, p. 71.
Cirrhitichthys marmoratus Day, Fishes of India. Prt. I, 1875, p. 146.
Cirrhites marmoratus Bleeker, Atl. Ichth. VIII, 1876—1877, p. 142.
Cirrhites marmoratus Klunzinger, Die Fische des Rothen Meeres 1884, p. 67.
Cirrhites marmoratus Sauvage, Poissons de Madagascar 1891, p. 209.
Cirrhitichthys maculatus Steindachner, Abh. Senckenb. Naturf. Ges. XXV, 1901, p. 423.
Cirrhitus marmoratus Bryan & Herre, Occas. Papers B. P. Bishop Mus. II, 1903, p. 131.

Cirrhitus marmoratus Jordan & Evermann, Bull. U.S. Fish Comm. XXIII (1903) 1905, p. 452.
Cirrhitus marmoratus Jordan & Seale, ibid. XXV (1905) 1906, p. 278.
Cirrhitus marmoratus Jordan & Herre, Proc. U. S. Nat. Mus. XXXIII (1907) 1908, p. 159.
Cirrhitichthys maculatus Gilchrist & Thompson, Ann. S. Afric. Mus. VI. Prt. 2. 1908, p. 174.
Cirrhites marmoratus M. Weber, Siboga Exp. Fische, 1913, p. 258.
Cirrhitus marmoratus Barnard, Ann. S. Afric. Mus. XXI, 1925—1927, p. 452.
Cirrhitus pinnulatus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 237. — ibid. XI, No. 5, 1931, p. 338. — ibid. No. 6, 1934, p 422.
Cirrhitus marmoratus P. J. Schmidt, Trans. Pacific Comm. Acad. Sc. USSR I, 1930, p. 61.
Cirrhitus marmoratus Pietschmann, B. P. Bishop Mus. Bull. 73. 1930, p. 15.

D. X. 11 (12). A. III. 6 (7). P. 1.6 + 7. V. I. 5. Ll. 36—40.

Ltr. $\begin{array}{c}4\\ \hline 1\\ \hline 12\end{array}$.

Height 2.8—3, 3.4—3.5 in length with caudal. Head 2.7—2.9, 3.3—3.4 in length with caudal. Eye 4—4.9, 1.3—1.6 in snout and equal to or somewhat less than the interorbital space, which is concave, as the eyes are placed so high up as to interfere with the upper profile of the head. Mouth rather large, oblique. Maxillary reaching to below middle of eye. Nostrils rounded, close together, immediately before eye; the anterior one with a posterior flap, which is fringed at the top. A row of pointed teeth in the jaws, the anterior ones in the lower jaw more distant and strong canines; in the upper jaw only the most anterior ones near symphysis are canines. A patch of villiform teeth anteriorly on each side of the

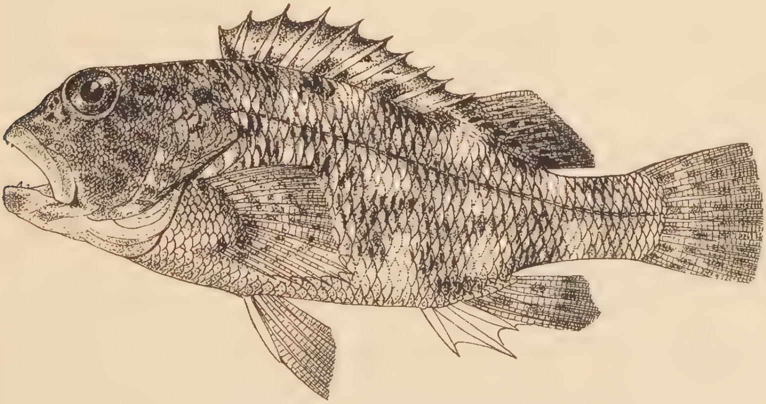

Fig. 1. *Cirrhitus pinnulatus* (Bl. Schn.). × 5/8.

symphysis in upper and lower jaw. A few rows of small teeth on the head of the vomer and a single row of similar teeth on the palatines. About 20 transverse rows of scales on the cheek. A narrow posterior and inferior limb of preopercle naked, its hind-border denticulated. Interopercle, subopercle, and anterior border of opercle with patches of small scales. Scales of rest of opercle large. Dorsal spines strong; their membranes deeply incised. Fourth, fifth, and sixth spines subequal, longer than the others and about equal to snout and half eye. Last spine about half length of first dorsal ray, which is equal to snout and eye together. Third anal spine longer and stronger than the others, equal to snout and eye. First anal ray equal to head without snout. Lower unbranched pectoral rays longer than the upper, branched ones, the longest half diameter of eye shorter than head without snout. Ventrals rounded, equal to postorbital part of head. Caudal truncate, slightly rounded when expanded. Colour of preserved specimens reddish or violet-grey. Head and body with numerous reddish-brown spots, forming more or less distinct longitudinal stripes on sides of head. Large white blotches on side, more or less regularly arranged in rows. Belly uniform. Chin with a dark brown spot, surrounded posteriorly by a broad white and again by a dark semicircular band. Fins, with exception of the ventrals, spotted with brown. Length 243 mm.

Habitat: Sumatra (Priaman); Bali; Talaut Islands!; Halmahera; Ambon. — Coast of Natal, Madagascar, Réunion, Mauritius, Red Sea, Arabian Sea, coasts of British India, Christmas Island!, South Japan, Riu Kiu Islands, Philippines, New Hebrides, Nauru (Pleasant Island); Funafuti, Samoa, Cook Islands, Society Islands, Marcus Island, Pearl and Hermes reef, Hawaii.

In sea. According to Klunzinger living on the slope of reefs, hidden in crevices, the head only showing and waiting there for prey. At night it also visits the reef, but goes immediately back to its refuge when danger threatens.

Note. This species has generally been called by the name given to it by Lacepède. Fowler (l.c.) was the first to identify it with *Labrus pinnulatus* Bloch, Schneider. Although the description, made by the author after the manuscript of Forster, is very incomplete, the later one by Lichtenstein, who studied Forster's collection, leaves no doubt that *Labrus marmoratus* Lac. is a synonym of *Labrus pinnulatus* Bl. Schn.

2. **Paracirrhites** Bleeker.

(Bleeker, Verh. Akademie Amsterdam XV, (1874) 1875. Cirrhitéoïdes, p. 5)

Oblong, rather compressed. Snout obtuse, the mouth far below level of eye. Body covered with rather small scales. Head scaly, excepting snout. Scales on cheek large, those on preopercular limb, sub- and interopercle very small. Scales of opercle large, the anterior rows however small. Posterior border of preopercle crenulated. Moderate canines in both jaws, besides villiform teeth. Vomer with a patch of small teeth. No teeth on palatines. Dorsal with X spines and 11 (12)—14 rays. Anal with III spines and 6 rays. Pectoral with 6—7 simple rays. Caudal slightly rounded. Gillmembranes united, free from isthmus.

Distribution: Few species from tropical and subtropical parts of Pacific and Indic. Red Sea.

Key to the Indo-australian species of Paracirrhites

1. Head more or less speckled with dark spots. Generally a black longitudinal band in posterior part of body. Height of head 1.2 in its length . . . . 1. *P. forsteri* p. 5.
2. Head without spots, but with a narrow white line, forming a loop behind eye. A white longitudinal band on body may be present. Snout shorter, more obtuse. Height of head equal to its length . . . . 2. *P. arcatus* p. 7.

1. **Paracirrhites forsteri** (Bl. Schn.) (Fig. 2, p. 6)

Grammistes Forsteri Bloch, Schneider, Syst. Ichthyol. 1801, p. 191.
Sparus pantherinus Lacepède, Hist. Nat. Poissons IV, 1802, p. 53.
Cirrhites pantherinus Cuvier & Valenciennes, Hist. Nat. Poissons III, 1829, p. 70.
Cirrhites pantherinus Lesson, Voyage Coquille. Zool. 1830, p. 225.
Gerranus tankervillae Bennett, Fishes of Ceylon 1828—1830, p. 27.
Cirrhites pantherinus Bleeker, Nat. Tijdschr. Ned. Indië II, 1851, p. 232.
Cirrhites forsteri Günther, Cat. Brit. Mus. II, 1860, p. 71.
Amblycirrhitus pantherinus Bleeker, Ned. Tijdschr. Dierk. III, 1866, p. 175.
Cirrhites Forsteri Klunzinger, Verh. zool. bot. Ges. Wien XX, 1870, p. 797. — Fische des Rothen Meeres I, 1884, p. 68.
Cirrhites forsteri Günther, Fische der Südsee I, 1873—1875, p. 69.
Cirrhites forsteri Day, Fishes of India, Prt. I, 1875, p. 144.
Paracirrhites Forsteri Bleeker, Atl. Ichth. VIII, 1876—1877, p. 143.
Cirrhites forsteri Steindachner, Denkschr. Akad. Wien LXX, 1900, p. 490. — Abh. Senckenb. naturf. Ges. XXV, 1901, p. 423.
Paracirrhites forsteri Jenkins, Bull. U. S. Fish Comm. XXII (1902) 1904, p. 490.

Paracirrhites forsteri Jordan & Evermann, ibid. XXIII (1903) 1905, p. 450.
Paracirrhites forsteri Barnard, Ann. S. Afric. Mus. XXI, 1925—1927, p. 450.
Paracirrhites forsteri Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 239. ibid. XI, 1931, p. 339.

D. X. 11. A. III. 6. P. 1.6 + 7 or 1.7 + 6. V. I. 5. Ll. 45—46.
Ltr. $\begin{array}{c} 5 \\ \hline 1 \\ \hline 10-12 \end{array}$.

Height 2.9—3, 3.5 in length with caudal. Head 2.8—3, 3.4—3.5 in length with caudal. Height of head 1.2 in its length. Eye 4.2—5.1, 1.3—1.5 in snout and somewhat more than nearly flat interorbital space. Mouth rather large, oblique. Maxillary reaching to below anterior half of eye. A band of villiform teeth, broader near symphysis, in the upper jaw, with an outer row of longer, pointed teeth. Anteriorly two strong canines. In the lower jaw the band of villiform teeth is narrow, and developed anteriorly only.

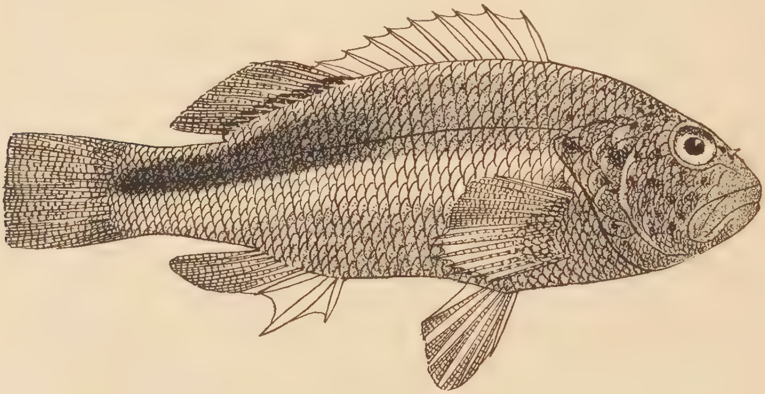

Fig. 2. *Paracirrhites forsteri* (Bl. Schn.) n.s.

The outer row consists of unequal pointed teeth, some of them in the sides of the jaws are canines. Head of vomer with an arched patch of small teeth. No teeth on palatines. Anterior nostril with a fringed flap. Five transverse rows of scales on cheeks, these scales mixed with smaller ones (squamulae). Similar small scales on preopercular limb, on opercular flap and in small patches on posterior part of preorbital and of chin, on snout and on interorbital space. Posterior border of preopercle crenulated. About 12 rows of scales before dorsal. First dorsal spine equal to eye. Third, fourth, and fifth spines longest, equal to snout. Last dorsal spine somewhat longer than ninth. Membranes between the spines somewhat incised. First soft dorsal ray equal to snout and eye, following rays gradually decreasing in length to the last. First anal spine more than half length of second spine, which is longer and stronger than the third and equal to snout and half diameter of eye together. First anal ray equal to snout and eye, following rays slightly decreasing in length. Pectorals with six or seven lower simple rays, the longest reaching to above middle of depressed ventral fin. Ventrals equal to snout and eye. Caudal slightly rounded. Colour of preserved specimens yellowish-brown, back sometimes darker, with light longitudinal narrow bands. A broad light yellowish band from below eye or from opercle to base of caudal. Above this band a deep brown band, beginning below origin of soft dorsal and very variable, sometimes almost wanting. Head with brown spots which may be present on the whole sides of the head and even spread to the base of the pectorals, or only distinct behind eye and on opercle. Spinous dorsal uniform or with a dusky outer margin. A more or less distinct dark longitudinal median band on soft dorsal. Membrane of soft anal more or less dusky. Caudal uniform light yellow or with a narrow dusky margin to the outer rays. Pectorals and ventrals yellowish. Length 225 mm.

Habitat: Pulu Weh!; Java (Patjitan); Celebes (Menado); Sangir Islands; Ternate; Ambon; Banda!; Waigeu; New Guinea (Manokwari, Port Moresby). — Coast of South Africa, Great Comoro, Seychelles, Mauritius, Réunion, Red Sea, coasts of British India, Ceylon, Andamans, Formosa, Riu Kiu Islands, Philippines, New Hebrides, Fiji, Samoa, Marquesas Islands, Society Islands, Hawaii.

In sea.

2. **Paracirrhites arcatus** (C. V.)

Cirrhites arcatus Cuvier & Valenciennes, Hist. Nat. Poissons III, 1829, p. 74.
Cirrhites arcatus Lesson, Voyage Coquille, Zool. 1830, p. 227.
Cirrhites arcatus Richardson, Zool. Voyage Samarang. Fishes 1848, p. 26.
Cirrhites arcatus Bleeker, Acta Soc. Sc. Indo-Neerl. I, 1856, p. 41.
Cirrhites amblycephalus Bleeker, Nat. Tijdschr. Ned. Indië XIII, 1857, p. 378.
Amblycirrhites arcatus Bleeker, Ned. Tijdschr. Dierk. III, 1866, p. 175.
Amblycirrhites amblycephalus Bleeker, l.c.
Cirrhites arcatus Kner, Sitzber. Akad. Wien LVIII, 1868, p. 308.
Cirrhites arcatus Günther, Fische der Südsee I, 1873—1875, p. 70.
Paracirrhites arcatus Bleeker, Verh. Akademie Amsterdam XV, 1875, Cirrhitéoïdes, p. 8. Atl. Ichth. VIII, 1876—1877, p. 144.
Paracirrhites amblycephalus Bleeker, ibid. p. 9. — ibid. p. 145.
Cirrhites arcatus Sauvage, Poissons de Madagascar 1891, p. 210.
Cirrhites (*Amblycirrhites*) *arcatus* Steindachner, Denkschr. Akad. Wien, LXX, 1900, p. 490.

Paracirrhites arcatus Seale, Occas. Papers B. P. Bishop Mus. I. 1901, p. 79.
Paracirrhites arcatus Jenkins, Bull. U. S. Fish Comm. XXII (1902) 1903, p. 491.
Paracirrhites arcatus Jordan & Evermann, ibid. XXIII (1903) 1905, p. 450.
Paracirrhites arcatus Barnard, Ann. S. Afric. Mus. XXI, 1925—1927, p. 451.
Paracirrhites arcatus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 239.

D. X. 11 (12). A. III. 6. P. 2.5 + 7. V. I. 5. Ll. 48. Ltr. $\begin{array}{c} 5\frac{1}{2} \\ \hline 1 \\ \hline 12 \end{array}$.

Height 2.5, 3 in length with caudal. Head 2.9, 3.5 in length with caudal. Height of head equal to its length. Eye 5.3, 1.5 in snout, and about equal to interorbital space, which is somewhat concave, the eyes being slightly prominent. Mouth large, oblique, somewhat arched. Maxillary reaching to below middle of eye. A band of villiform teeth, broader near symphysis, in the upper jaw, with an outer row of longer, crowded, pointed teeth. Anteriorly two canines. In the lower jaw the band of villiform teeth is only developed near symphysis; the outer row consists of pointed teeth, some of those in the sides of the jaw are canines. Head of vomer with an arched patch of small teeth. No teeth on palatines. Anterior nostril with a flap, which is festooned at its extremity. Five transverse rows of scales on cheeks, these scales mixed with small ones (squamulae). Similar small teeth on preopercular limb, on opercular flap, and between scales of opercle, on posterior part of preorbital, and of chin; on interorbital space, and behind eye. Posterior border of preopercle crenulated. About 12 rows of scales before dorsal. First dorsal spine as long as eye; third to sixth spines longest, subequal, as long as snout. The membranes between the spines somewhat incised. First dorsal ray produced, as long as postorbital part of head; following rays gradually decreasing in size to the last. First anal spine half as long as second, which is stronger and somewhat longer than third, and equal to snout and eye. First anal ray slightly less than postorbital part of head. Longest simple pectoral rays reaching to above end of ventral spine, when this fin is depressed. Ventrals almost equal to postorbital part of head. Caudal slightly rounded. Colour in spirits reddish-brown, with indications of numerous lighter longitudinal narrow bands. A white narrow line, beginning at anterior part of lower border of eye, running backwards along eye and beyond, forming an upward loop on temporal region, and running again forward to upper part of hindborder of eye. The space inside the loop is dark brown. A broad creamy band, beginning below middle of spinous part of dorsal and ending at base of caudal. The lower margin of this band overlaps the lateral line slightly in its posterior course. This band may be wanting. Soft dorsal with a median black band. Caudal dark brown, excepting the upper rays, which are creamy. Anal, pectorals, and ventrals light brownish. Length 135 mm.

Habitat: Celebes (Menado); Ternate; Banda!; New Guinea (South East Coast). — Cape of Good Hope?, Madagascar, Réunion, Mauritius, Solomon Islands, Rotuma, Samoa, Society Islands, Hawaii.

In sea.

3. **Cirrhitichthys** Bleeker

(Bleeker, Acta Soc. Sc. Indo-Neerl. II, 1857, Achtste bijdrage vischfauna Amboina, p. 39.)
Amblycirrhites Gill, Proc. Acad. Nat. Sc. Philadelphia 1862, p. 105.
Cirrhitopsis Gill, ibid. p. 109.

Oblong, compressed. Snout obtuse, the mouth far below level of eye. Body covered with moderate or small scales. Head scaly, excepting snout. Scales on cheek large. A narrow posterior and inferior part of preopercular limb naked, rest with some small scales near its edge. Scales of interopercle, subopercle, and operculum large. Preopercle strongly denticulated. Villiform teeth in both jaws, besides some large ones in the upper jaw and a canine in the sides of the lower jaw. Teeth on vomer and palatines. Dorsal with X spines and 11—17 rays. Anal with III spines and 6 rays. Pectorals with 5—7 simple rays. Caudal slightly rounded, truncate or emarginate. Gillmembranes united, free from isthmus.

Distribution: Tropical parts of Indic and Pacific. Red Sea.

Key to the Indo-australian species of Cirrhitichthys

1. D. X. 11 (12). Ll. 39—41. Caudal truncate or slightly rounded . . . . 1. *C. aprinus* p. 9.
2. D. X. 16—17. Ll. 45—50. Caudal emarginate . . . . 2. *C. polyactis* p. 12.

1. **Cirrhitichthys aprinus** (C. V.). (Fig. 3, p. 11)

Cirrhites aprinus Cuvier & Valenciennes, Hist. Nat. Poissons III, 1829, p. 76.
Cirrhites fasciatus Cuvier & Valenciennes, l.c.
Cirrhites graphidopterus Bleeker, Nat. Tijdschr. Ned. Indië IV, 1853, p. 106.
Cirrhites oxycephalus Bleeker, ibid. VIII, 1855, p. 408.
Cirrhitichthys graphidopterus Bleeker, ibid. XIV, 1857, p. 450.

Cirrhitichthys oxyrhynchos Bleeker, ibid. XV, 1858, p. 205.
Cirrhitichthys graphidopterus Günther, Cat. Brit. Mus. II, 1860, p. 74.
Cirrhitichthys oxycephalus Günther, ibid. p. 75.
Cirrhitichthys graphidopterus Steindachner, Verh. zool. bot. Ges. Wien XI, 1861, p. 75.
Cirrhites aprinus ?Jouan, Mém. Soc. Sc. Nat. Cherbourg XIII ((2) III), 1867, p. 250.
Cirrhitichthys bleekeri Day, Proc. Zool. Soc. London 1873, p. 705.
Cirrhites oxycephalus Günther, Fische der Südsee I, 1873—1875, p. 71.
Cirrhites fasciatus Day, Fishes of India. Prt. I, 1875, p. 145.
Cirrhitichthys aprinus Bleeker, Atl. Ichth. VIII, 1876—1877, p. 146.
Cirrhitichthys oxycephalus Bleeker, ibid. p. 147.
Cirrhites aprinus Klunzinger, Fische des Rothen Meeres I, 1884, p. 67.
Cirrhitichthys aprinus Ramsay & Ogilby, Proc. Linn. Soc. New S. Wales X, 1886, p. 575.
Cirrhitichthys fasciatus Day, Fishes of India Suppl. 1888, p. 788.
Cirrhitichthys calliurus Tate Regan, Journ. Bombay Nat. Hist. Soc. XVI, 1905, p. 322.
Cirrhitichthys oxycephalus M. Weber, Siboga Exp. Fische, 1913, p. 258.
Cirrhitichthys aprinus M. Weber, ibid. p. 259.
Cirrhitichthys aprinus Barnard, Ann, S. Afric. Mus. XXI, 1925—1927, p. 453.
Cirrhitichthys oxycephalus Barnard, l.c.
Cirrhitus oxycephalus Fowler, Mém. B. P. Bishop Mus. X, 1928, p. 238.
Cirrhitus oxyrhynchos Fowler, l.c.
Cirrhitichthys aprinus P. J. Schmidt, Trans. Pacific Comm. Acad. Sc. U.S.S.R. I, 1930, p. 60.
Cirrhitichthys aureus Fowler, Hongkong Nat. II, 1931, p. 306 (nec Schl. ?).
Amblycirrhitus indicus Fowler, Proc. U. S. Nat. Mus. LXXXV, 1938, p. 49.
Acanthocirrhitus oxycephalus Fowler, ibid. p. 50.

D. X. 11. (12). A. III. 6. P. 1.7 + 6 or 1.8 + 5. V. I. 5. Ll. 39—41. Ltr. $\begin{array}{c} 4 \\ \hline 1 \\ \hline 9-11 \end{array}$.

Height 2.3—2.7, 2.7—3.4 in length with caudal. Head 3—3.1, 3.4—3.7 in length with caudal. Height of head more than its length in large specimens, less than its length in small ones. Eye 3.2—4.7, less than snout and much less than concave interorbital space. Mouth oblique. Lips thick. An elongate patch of villiform teeth in the jaws; the teeth of the outer row in the upper jaw somewhat more pointed. In the lower jaw two rather strong canines in each ramus, behind the tapering end of the villiform patch. A patch of villiform teeth on vomer and palatines. Preorbital without scales, in adults often with about 4—5 strong denticulations. Four transverse rows of scales on cheek. Preopercle strongly denticulated along its edge and posterior border. A narrow posterior preopercular limb naked. Head naked above, with exception of a patch of scales on interorbital space. Scales on upper part of head beginning immediately behind eye. About 7 rows of scales before dorsal. First dorsal spine equal to eye; spines increasing in length to the fifth, which is equal to postorbital part of head. Sixth and seventh spines only a little shorter. Membranes between the spines deeply incised, each spine with a more or less brush-like prolongation at its top. First soft dorsal ray generally produced and as long as head without snout; following rays much shorter, the soft dorsal being of about the same height as the spinous part. First anal spine equal to eye, third spine longest and strongest, equal to postorbital part of head and half eye. Longest soft anal rays not much shorter than third spine. Pectorals generally with six, sometimes with seven or with five simple rays, the longest reaching to anus or on anal. Ventrals equal to head without snout or half diameter of eye shorter. Caudal truncate or slightly rounded. Colour of preserved specimens yellowish or light brownish. Darker or lighter brown blotches arranged in transverse rows on the body, smaller and more irregularly scattered on head. With age these bands fuse and form more or less distinct broad transverse bands on the body and narrow ones on sides of head. Dorsal and anal variegated with brown, sometimes with a dark outer border. Caudal light, with or without dark spots and a dark margin. Length 100 mm.

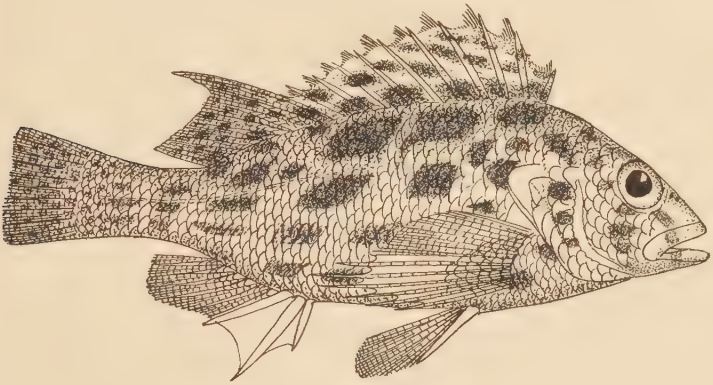

Fig. 3. *Cirrhitichthys aprinus* (C.V.). × $1^1/_2$.

Habitat: Pulu Weh!; Coast of Sumatra!; Celebes (Menado); Postillion Islands!; Kabaena; Binongka!; Flores; Timor!; Buru; Ambon; Nusa Laut!; Goram; Banda!; Tiur!; Kei Islands!; New Guinea (Manokwari, Friedrich Wilhelm Hafen). — Coast of Natal, Madagascar, Red Sea, Arabian Sea, Réunion, Maldives, Chagos Archipelago, coasts of British India, Riu Kiu Islands,

Hongkong, Philippines, Pelew Islands, coast of New South Wales, Fiji, Rotuma, Bonham Island, Marshall Group, Society Islands.
In sea.

Note. Klunzinger l.c. expressed, although hesitatingly the opinion that *C. oxyrhynchus* and *C. oxycephalus* are only young or somewhat elongate specimens of *C. aprinus*. Although the identity of the two species of Bleeker has been recognised, f. i. by Weber, *C. aprinus* has generally been kept apart on account of the serrature of the preorbital. As Barnard l.c. says that the preorbital is frequently entire in South African specimens and as my rather scanty material points in the same direction, I have no doubt that the three species can be united. *C. aprinus* is very close to *C. aureus* Schl. from Japan, but this last species is said to be uniform. Although the markings on the body vary much in intensity—*C. calliurus* Reg. is a very dark variety—I have never seen uniform specimens. Those of the Riu Kiu Islands belong to *aprinus* and so do those of Hongkong described by Jouan and by Fowler, although lastnamed calls them *aureus*. Probably *aureus* differs in no other points than the colour and ought to be considered as a geographical subspecies. The number of simple pectoral rays is generally six, but Steindachner l.c. has already drawn attention to the fact, that there are specimens with six and with seven rays. I find the same in my material. *C. oxyrhynchus* has only 5 simple rays in the pectoral, but I have no doubt that this is only a minus-variation.

2. **Cirrhitichthys polyactis** Blkr.

Cirrhitichthys polyactis Bleeker, Verh. Akad. Amsterdam XV (1873) 1874, p. 16. — Atl. Ichth. VIII, 1876—1877, p. 147.
Cirrhitichthys polyactis M. Weber, Siboga Exp. Fische, 1913, p. 259.
Cirrhitichthys polyactis McCulloch, Mem. Queensl. Museum VII, Prt. 4, 1922, p. 243.

D. X. 16—17. A. III. 6. P. 1.7 + 6. V. I. 5. Ll. 45—50. Ltr. $\begin{array}{c}4\\ \hline 1\\ \hline 9\end{array}$.

Height 2.8—2.9, 3.4—3.7 in length with caudal. Head 3.2—3.4, 4—4.1 in length with caudal. Eye 3.2—4, equal to or somewhat less than snout and more than interorbital space, which is concave, but almost flat in young specimens. Mouth very oblique, reaching to below anterior part of eye or not so far. Lips thick. An outer row of stronger teeth in the upper jaw followed by a band of villiform teeth, which is widest near symphysis. Lower jaw with a strong canine on each side, followed by a row of conical teeth; a band of villiform teeth between the canines. Vomer with a curved band of minute teeth, and a very small band of teeth on the anterior portion of the palatines. Cheeks with 3 rows of scales. Preopercle strongly denticulated behind. About 10 rows of scales before dorsal. Fifth dorsal spine longest, as long as first dorsal ray and half diameter of eye longer than postorbital part of head. First anal spine more than half length of second, which is slightly longer than third, and about as long as longest dorsal spine. Longest simple pectoral rays reaching on anal. Ventrals about equal to snout and eye together. Caudal emarginate, the outer lobes more or less produced into filaments. Colour of preserved specimens uniform, upper half of the spinous dorsal dark. Length 125 mm.

Habitat: Ambon; Timor! — Queensland.
In sea.

4. **Oxycirrhites** Bleeker

(Bleeker, Acta Soc. Sc. Indo-Neerl. II, 1857. Achtste bijdrage vischfauna Amboina p. 39)

Elongate, much compressed. Snout pointed, the premaxillaries and the dentals depressed, elongate or even produced into a beak. Ascending pedicels of premaxillaries long, reaching to interorbital space. Body covered with moderate or rather small scales. The mouth about in the level of the lower border of the eye. Cheeks and opercles as well as upper part of head scaly. Preorbital scaly. The scales of cheeks, inter- and suboperculum large. Teeth in the jaws small, pointed, in the lower jaw sometimes caninoid. Teeth on vomer, none on palatines. Dorsal with X spines and 12—13 (14) rays, the first ray much longer than the last spines and the dorsal therefore notched. Anal with III spines and 6—7 (8) rays. Pectoral with 5 simple rays. Caudal rounded or slightly forked. Gillmembranes united, free from isthmus.

Distribution: Mauritius, Indo-australian Archipelago, Philippines, Hawaii.

Key to the Indo-australian species of Oxycirrhites

a. Mouth not produced into a beak. Posterior end of maxillary below frontborder of eye. Last dorsal spine not much longer than penultimate one. Caudal rounded (*Cirrhitoidea*) . . . . 1. *O. bimacula* p. 14

b. Mouth produced into a beak. Posterior end of maxillary far before frontborder of eye. Last dorsal spine much longer than penultimate one. Caudal slightly forked . . . . 2. *O. typus* p. 15.

1. **Oxycirrhites (Cirrhitoidea) bimacula** (Jenkins).

Cirrhitoidea bimacula Jenkins, Bull. U. S. Fish Comm. XXII (1902) 1904, p. 489.
Cirrhitoidea bimacula Jordan & Evermann, ibid. XXIII (1903) 1905, p. 448.
Cirrhitoidea bimacula M. Weber, Siboga Exp. Fische, 1913, p. 260.
Cirrhitoidea bimacula Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 236. — ibid. XI, No. 5, 1931, p. 338. — ibid. No. 6, 1934, p. 422.
Oxycirrhites (Cirrhitoidea) bimacula Pietschmann, B. P. Bishop Mus. Bull. 73, 1930, p. 15.

D. X. 12. A. III. 6. P. 1. 8 + 5. V. I. 5. Ll. 40. Ltr. $\begin{array}{c}3\frac{1}{2}\\\hline 1\\\hline 10\end{array}$.

Height 2.8, 3.6 in length with caudal. Head 2.4, 3.2 in length with caudal. Eye 4, 1.3 in snout and more than somewhat concave interorbital space. Mouth protractile, slightly oblique. Maxillary reaching to below frontborder of eye. Five transverse rows of scales on cheeks. Hindborder of preopercle coarsely serrated; the inferior, and to a lesser extent also the posterior preopercular limb naked. Preorbital scaly. About 20 rows of scales between snout and dorsal. Third to sixth dorsal spines longest, equal to snout. Membranes between the spines incised, and each spine with a bundle of tiny filaments near its top. Soft part of dorsal higher than spinous one. First dorsal ray equal to snout and eye together, following rays slightly decreasing in size posteriorly. First anal spine about half length of second, which is longer than third and equal to snout and half eye together. Longest anal rays as long as longest dorsal rays. Longest simple rays of pectoral reaching on anal. Ventral slightly pointed, more than postorbital part of head. Caudal slightly rounded. Colour of preserved specimen yellowish, with light brown, rather faint transverse bands on body and tail. A dark brown spot, about as large as eye, and encircled by white, on operculum, and a similar ocellus immediately below posterior dorsal rays. Dorsal dusky towards its outer margin. Other fins hyaline or light yellowish. Description made after a specimen of 38 mm. Length 50 mm.

Habitat: South Island near Saleyer!. — Pearl and Hermes reef, Hawaii.

On coral reefs.

2. **Oxycirrhites (Oxycirrhites) typus** Blkr. (Fig. 4, p. 15).

Oxycirrhites typus Bleeker, Acta Soc. Sc. Indo-Neerl. II, 1857. Achtste bijdrage vischfauna Amboina, p. 40. — Verh. Akad. Amsterdam XV (1873) 1874, p. 17. — Atl. Ichth. VIII, 1876—1877, p. 148.
Oxycirrhites typus Günther, Cat. Brit. Mus. II, 1860, p. 76.

D. X. 13. A. III. 7 (8). P. 2.7 + 5. V. I. 5. Ll. 52. Ltr. $\begin{array}{c}4\\ \hline 1\\ \hline 10\end{array}$.

Height 4.1, 4.9 in length with caudal. Head 2.4, 2.8 in length with caudal. Height of head 2.5 in its length. Eye 7, 4 in snout and equal to slightly concave interorbital space. Premaxillaries depressed, almost flat above, their anterior border rounded, when seen from above. Pedicel of premaxillaries almost reaching to between eyes. Teeth in the jaws small, pointed, the anterior ones directed backwards. Preorbital long, with three rows of very small scales along its inferior border, which is entire. Three transverse rows of scales on cheek. Naked preopercular limb very narrow. Seven strong teeth along hindborder of preopercle and ten small ones along its inferior border. Ten scales before dorsal. First dorsal spine half length of second, which is somewhat shorter than third. Third to seventh spines subequal, as long as postorbital part of head. Eighth and ninth spines much shorter, tenth as long as third. Membranes between the spines deeply incised. First dorsal ray somewhat longer than last spine. Soft dorsal higher than spinous part, its basal part scaly. First anal spine less than half length of second, which is longest and strongest and equal to postorbital part of head and half eye. Third spine longer than first. Soft anal truncate, less scaly than dorsal, its first ray as long as second spine. Pectoral as long as snout. Ventrals one third diameter of eye longer than postorbital part of head. Ventral spine strong, equal to postorbital part of head. Caudal slightly forked.

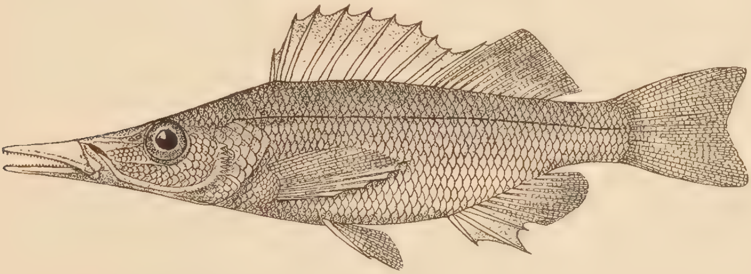

Fig. 4. *Oxycirrhites* (*Oxycirrhites*) *typus* Blkr. n. s.

This description is made after the type in the Leiden Museum. It is now discolored, but according to Bleeker the body and tail had oblique and longitudinal dark narrow bands, crossing each other. Dorsal with longitudinal bands. Length 101 mm.

Habitat: Only two specimens are known, the type from Amboina and another one from Mauritius, recorded by Günther l.c.

Note. One more species of this subgenus has been described, viz. *O. morrisi* Fowler (Proc. Acad. Nat. Sc. Philadelphia LXXXV, 1934, p. 359) from Palawan. It is very close to *O. typus* but seems to differ in having a few scales less in the lateral line, and in having more denticles along the preopercle edge. As so few specimens are known, it is difficult to say if *O. morrisi* falls inside the limits of variation of *O. typus*.

Bleeker says that the snout has no scales and he figures the preorbital as scaleless, but the type specimen shows distinct longitudinal rows of small scales.

3. Division LABRIFORMES

Body oblong, compressed, seldom cylindrical and elongate, covered with cycloid scales. Lateral line continuous or interrupted in its posterior part. Spinous dorsal well developed; generally the spines are rigid and pungent, but sometimes the anterior spines or all spines are flexible. Two to six anal spines. Ventrals thoracic, with one spine and five soft rays. Five or six branchiostegals. Three gills and a half. Lower pharyngeals ankylosed, second upper pharyngeals united with third and fourth. Teeth in the jaws, none on vomer or palatines. One or more canines in the posterior part of the jaws, near corner of mouth, may be present.

Key to the Indo-australian families of Labriformes

1. Mouth protractile. Teeth separate . . . . 1. *Labridae* p. 16.
2. Mouth non-protractile. Maxillary firmly attached to premaxillary. Teeth more or less united . . . . . . 2. *Scaridae* p. 255.

1. Family LABRIDAE

Mouth protractile; premaxillary pedicels well developed. Generally a single series of teeth on the cutting-edges of the jaws, the anterior ones as a rule larger, pointed canini or compressed incisivi. Small and generally granular teeth in several rows may be present on the innerside of the jaws. Dentigerous portion of lower pharyngeal ovate, triangular, or with a posterior prolongation, with conical, granular or molariform teeth. Upper pharyngeals similarly toothed.

Distribution: All temperate and tropical seas.

Key to the Indo-australian genera of Labridae

A. Eleven to thirteen dorsal spines, in one case ten.
  1. Lateral line interrupted. D. XI—XII. 9. 10. Preopercle finely denticulated. Two rows of scales on cheek . . . . 1. *Cirrhilabrus* p. 20.
  2. Lateral line continuous.
    a. D. XI. 12 (13). Six rows of scales on cheek. Preopercle crenulated. A pair of spatulate incisivi anteriorly in the jaws . . . . 2. *Pseudodax* p. 25.
    b. D. X, XII or XIII. No spatulate incisivi. Cheeks scaly.
      a^1. Upper lip covered when the mouth is closed. Preorbital deep.
        a^2. Upper lip thin, sword-like, compressed. Scales on cheek in 3 rows . . . . 3. *Xiphocheilus* p. 26.
        b^2. Upper lip not very thin, not sword-like . . . . 4. *Choerodon* p. 30.
      b^1. Upper lip not covered when the mouth is closed. Preorbital less deep.
        a^2. Twelve dorsal spines. Teeth in a single series in the jaws, and more or less coalesced. No villiform teeth. Caudal truncate 5. *Bodianus* p. 41.
        b^2. Ten dorsal spines. A villiform band of teeth in the upper jaw and a patch of villiform teeth at symphysis in the lower jaw. Caudal forked . . . . 6. *Parabodianus* p. 50.

B. Eight to nine dorsal spines, seldom ten.
  1. Lateral line interrupted.
    a. Scales small. Ll. about 80. First and second dorsal spines flexible . . . . 7. *Cymolutes* p. 51.
    b. Scales large. Ll. about 20—30.
      a^1. First and second dorsal spines flexible. Body much compressed.
        a^2. Head keeled. First and second dorsal spines produced, somewhat remote from but connected

with following spines by a low membrane. Cheeks with several rows of scales . . . . 8. *Hemipteronotus* p. 53.

b^2. Head keeled. First and second dorsal spines produced, remote and detached from the following spines, and forming a separate fin. Cheeks practically without scales . . . . 9. *Iniistius* p. 62.

c^2. Head keeled. First and second dorsal spines not produced, not remote from the following spines, and connected with them by a membrane which is not lower than that between the other spines. Cheeks practically naked. 10. *Xyrichthys* p. 65.

d^2. Head not keeled. First and second dorsal spines not remote from the following, and connected with them by a membrane, which is not lower than that between the other spines. Cheeks with a few rows of scales . . 11. *Novaculichthys* p. 66.

b^1. First and second dorsal spines pungent and rigid like the following.

a^2. Mouth exceedingly protractile. Mandible much produced backwards . . . . 12. *Epibulus* p. 72.

b^2. Mouth not exceedingly protractile. Mandible normal.

a^3. Third anal spine longer than second . . . . 13. *Cheilinus* p. 74.

b^3. Second anal spine longer than third . . . . 14. *Pseudocheilinus* p. 96.

2. Lateral line continuous.

a. Two large incisivi anteriorly in the jaws, directed forwards, compressed and with a cutting edge . . . . . . 15. *Anampses* p. 98.

b. No incisivi; if the anterior teeth are large, they are pointed.

a^1. Body elongate, cylindrical. Height 5.5—8. One row of scales on cheeks 16. *Cheilio* p. 108.

b^1. Body less elongate, compressed.

a^2. Eight dorsal spines.

a^3. Snout produced, tubiform . 17. *Gomphosus* p. 111.

b^3. Snout not produced . . . 18. *Thalassoma* p. 117.

b^2. Nine dorsal spines.

a^3. Cheeks scaly.

a^4. Preopercle denticulated. Ll. 25 . . . . 19. *Duymaeria* p. 139.

b^4. Preopercle smooth.

a^5. Two straight, almost horizontal canines anteriorly in the jaws. Scales large. Ll. 28—29. Lips very thick 20. *Hemigymnus* p. 142.
b^5. Canines not horizontal. Species of small size.
a^6. Forehead scaleless.
a^7. Lower lip divided into two lobes, connected by a median frenulum. Scales moderate or large. Ll. 26—53 . . . . . . 21. *Labroides* p. 147.
b^7. Lower lip thick in its median part, thin laterally. Scales moderate. Ll. 35—43 . . . 22. *Diproctacanthus* p. 151.
b^6. Forehead scaly. Lips produced into a short rounded tube when the mouth is closed. Scales large. Ll. 28 . . . . 23. *Labrichthys* p. 152.
b^3. Cheeks naked or with a few scales only.
a^4. Scales large. Ll. 25—30.
a^5. No canines. Scales on thorax larger than those of sides . . . . 24. *Stethojulis* p. 155.
b^5. Moderate canines. Scales of thorax as large as those of sides. Only a few scales before dorsal 25. *Xenojulis* p. 169.
c^5. Scales of thorax smaller than those of sides.
a^6. Four canines in the jaws, the outer pair turned backwards. Body much compressed. Inferior pharyngeals with only 3 teeth, the middle one a large molar . . . 26. *Macropharyngodon* p. 171.

b^6. Four or two canines in the jaws, straight or slightly curved. Inferior pharyngeals with more than 3 teeth, without large median molar.

a^7. No canine at angle of mouth . . . 27. *Pseudojulis* p. 173.

b^7. A canine at angle of mouth . . . 28. *Halichoeres* p. 175.

b^4. Scales small. Ll. 50—80.

a^5. Canines in upper jaw curved outwards. Caudal emarginate, with the lobes more or less filamentous. Median teeth of posterior row of lower pharyngeals not larger than the others . . . . 29. *Pseudocoris* p. 238.

b^5. Canines in upper jaw straight. Caudal truncate or rounded. Median teeth of posterior row of lower pharyngeals larger than the others . . . 30. *Coris* p. 241.

c^4. Scales minute. Ll. 101—108. No canines at corner of mouth. All dorsal spines flexible. Median teeth of posterior row of lower pharyngeals not larger than the others . . . . 31. *Hologymnosus* p. 252.

1. **Cirrhilabrus** Schlegel

(Schlegel, Fauna Japonica, Pisces, 1846, p. 167)
Cheilinoides Bleeker, Nat. Tijdschr. Ned. Indië II, 1851, p. 71

Rather elongate, compressed. Head conical. Body covered with large scales, which form a well developed sheath on dorsal and anal. Base of caudal with three very large scales, the median one longest. Lateral line interrupted. Preopercle finely denticulated behind, with two transverse rows of scales. Mouth small, slightly protractile. Lips rather thin, not plated. Small pointed teeth in a single crowded series in both jaws; anteriorly to this row 6 canines in the upper jaw; the outer pair longest, and directed backwards and outwards as well as the next pair. Two small canines in the lower jaw. Dorsal consisting of XI or XII spines and 9—10 soft rays. Anal with III spines, the third the longest, and 8—9 rays. Pectorals somewhat pointed. Ventrals pointed, the first and second rays often produced. Caudal rounded.

FISH & WILDLIFE
PACIFIC OCEANIC
INVESTIGATIO

Distribution. About 5 species from Japan, Riu Kiu islands, Indo-Australian Archipelago and Hawaii. In rockpools and on coralreefs.

Key to the Indo-australian species

1. Ventrals produced into long filaments.
   a. Scales of sides and back with indigo hindborders, forming a patch behind pectorals . . . 1. *C. solorensis* p. 21.
   b. A pale band from side of snout to base of caudal . . . . 2. *C. temmincki* p. 22.
2. Ventrals not produced . . . . 3. *C. cyanopleura* p. 23.

1. **Cirrhilabrus solorensis** Blkr. (Fig. 5, p. 22)

Cirrhilabrus solorensis Bleeker, Nat. Tijdschr. Ned. Indië V, 1853, p. 88. — Atl. Ichth. I, 1862, p. 76.

Cirrhilabrus solorensis Günther, Cat. Brit. Mus. IV, 1862, p. 124.

Cirrhilabrus solorensis Macleay, Proc. Linn. Soc. New S. Wales VIII, 1883, p. 272.

Cirrhilabrus solorensis M. Weber, in Semon, Zoolog. Forschungsreisen V, 1895, p. 272. — Siboga Exp. Fische, 1913, p. 363.

Cirrhilabrus lyukyuensis Ishikawa, Proc. Dept. Nat. Hist. Tokyo Imp. Mus. I, No. 1, 1904, p. 12.

Cirrhilabrus solorensis P. J. Schmidt, Trans. Pac. Comm. Acad. Sci. USSR I, 1930, p. 77.

D. XI—XII. 9—10. A. III. 9 (10). P. 2. 13—14. V. I. 5. Ll. 17 + 8—10. Sq. l. 23—24. Ltr. $\frac{1\frac{1}{2}}{\frac{1}{7}}$.

Height 2.8—3.3, 3.5—4 in length with caudal. Head 3—3.5, 3.7—4.3 in length with caudal. Eye 4.3—4.6, 1.3—1.5 in snout and 1.3 in somewhat convex interorbital space. Mouth small, slightly oblique. Maxillary not reaching to below nostrils. A single row of minute teeth in the jaws and before it six canines in the upper jaw, the outermost largest and as well as the neighbouring pair curved outwards. Two small canines in the lower jaw. Preopercle finely denticulated behind; the two transverse rows of scales leave an inferior and a posterior limb naked; the posterior naked limb tapering superiorly. About six rows of scales before dorsal. First dorsal spine shorter than eye, the following increasing in length, the longest equal to snout and eye. Membrane between the spines scarcely incised. Soft dorsal slightly higher than spinous part, pointed behind. Anal beginning below last dorsal spine. First anal spine shortest, the third one longest, more than eye. Soft anal similar to soft dorsal, deeper than spinous part of anal. Pectorals somewhat pointed, the upper rays longest, equal to head without snout. Ventral with the first and specially the second ray produced into a filament, reaching on anal. Caudal rounded. Colour of preserved specimens: Upper part and sides of head and of anterior part of body, as far as end of pectorals, purplish-brown, sharply defined from creamy lower side of head and body. A row of light blue spots above lateral line, from head to below anterior part of dorsal. Rest of upper part and sides of body light purplish, also sharply defined from lower side. Scales of back and sides behind end of pectorals with an indigo hindborder, very broad immediately behind pectorals and forming here a more or less distinct patch. A dark blue band along base of pectorals. Base of anal, dorsal and caudal deep indigo, as also the spines and rays of these fins. In one specimen the opercular region, the gular region and the whole underside of the body is blue, fading towards the back, which is light reddish, all the scales with a blue border. Pectorals hyaline. Ventrals blue. Length 105 mm.

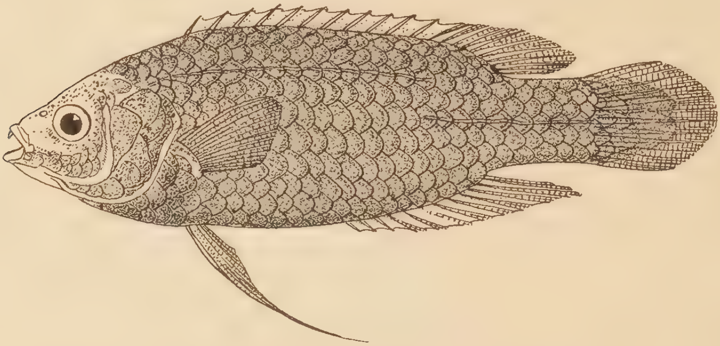

Fig. 5. *Cirrhilabrus solorensis* Blkr. n. s.

Habitat. Talaut Islands!; Ambon!; Ceram; Haruko; Banda; Flores; Rotti; Solor; New Guinea (Pitt Bay). — Riu Kiu Islands, Philippines. In sea.

2. **Cirrhilabrus temmincki** Blkr.

Cirrhilabrus spec. Schlegel, Fauna Japonica. Poissons, 1846, p. 167.

Cirrhilabrus temmincki Bleeker, Verh. Bat. Gen. XXV. Nalez. ichthyol. Japan. 1853, p. 17.

Cirrhilabrus temmincki Günther, Cat. Brit. Mus. IV, 1862, p. 124.

Cirrhilabrus temmincki Jordan & Snyder, Proc. U. S. Nat. Mus. XXIV (1901) 1902, p. 651.

Cirrhilabrus temmincki Jordan, Tanaka & Snyder, Journ. Coll. Sci. Univ. Tokyo XXXIII. Art. 1. 1913, p. 205.

Cirrhilabrus temmincki Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII. 1928, p. 338.

D. XI. 9. A. III. 9. Ll. 16—17 + 6—7. Ltr. $\begin{array}{c}2\text{—}4\\\hline 1\\\hline 6\text{—}7\end{array}$.

Height 3. Head $2^{7}/_{8}$—3. Eye $3^{7}/_{8}$—5, equal to or greater than snout, $1^{1}/_{6}$ or more in interorbital space. Mouth somewhat oblique. Maxillary not reaching to below eye. Lips thin. Teeth in the jaws in a single row laterally, very small; an outer row represented by 6 strong canines on the upper jaw and 2 on the lower, of the upper canines the middle pair are smallest and project forward, the others are larger, fang-like, and strongly curved backward; no posterior canine. Edge of preopercle finely serrated. Two rows of scales on cheek. Dorsal spines slender, their membrane not incised, the longest spine 2.1—2.5 in head. Soft dorsal not higher than spinous part, somewhat pointed behind. Third anal spine 3—4 in head. Soft anal similar to soft dorsal, but last rays slightly longer than those of dorsal. Pectorals rounded, about 1.5 in head. Ventrals falcate, extremely long in males, reaching beyond posterior end of base of anal. In females much shorter, not reaching anal opening. Colour of preserved specimens (males) brownish, pale or whitish below. Broad, slightly paler band from side of snout to bases of lower median caudal rays. Dorsal and anal pale, basally deep brownish. Caudal uniform. Paired fins pale or very light brownish, with slight dusky spot at base of pectoral. Females show 6 whitish blotches along upper edge of back and deep brown blotch about size of pupil on upper hind portion of caudal peduncle. Back also with many longitudinal whitish lines, more or less broken or irregular. Lower side specked and mottled with whitish. Males in life crimson and blue. Length 100 mm. (Compiled, not seen by us).

Habitat: Sulu Islands. — Japan. In sea.

3. **Cirrhilabrus cyanopleura** (Blkr.)

Cheilinoides cyanopleura Bleeker, Nat. Tijdschr. Ned. Indië II, 1851, p. 72.
Cirrhilabrus cyanopleura Bleeker, Act. Soc. Indo-Neerl. VI, 1859. Enum. spec. piscium. p. 102. — Atl. Ichth. I, 1862, p. 76.
Cirrhilabrus heterodon Bleeker, Arch. Neerl. Sc. Nat. VI, 1871, p. 326.
?*Cirrhilabrus cyanopleura* Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 339.

D. XI—XII. 8—9. A. III. 8—9. P. 2.13. V. I. 5. Ll. 16 + 7 or 16 + 9. Sq. l. 21—23. Ltr. $\begin{array}{c}1\frac{1}{2}\\\hline 1\\\hline 7\end{array}$.

Height 2.8—3, 3.5—6 in length with caudal. Head 3.1—3.2, 3.8 in length with caudal. Eye 3.6—4, 1—1.2 in snout and 1—1.2

in slightly convex interorbital space. Mouth small, somewhat oblique. Maxillary scarcely reaching to below nostrils. A single row of small pointed teeth in the jaws and six canines before that row in the upper jaw, the two outer ones on each side directed outwards, the outer pair the longest. Two small canines in the lower jaw. Preopercle finely denticulated behind, with two transverse rows of scales, leaving an inferior and a posterior limb naked, the posterior limb tapering above. Scales on upper part of head beginning behind eye. Six or seven rows of scales before dorsal. First dorsal spine shorter than eye, the following increasing in length, the longest equal to postorbital part of head. The membranes between the spines scarcely incised. Soft dorsal scarcely higher than spinous part, pointed behind. Anal beginning below last dorsal spine. First anal spine shortest, third longest, but not much longer than second, equal to snout. Soft anal similar to soft dorsal. Pectorals somewhat pointed, equal to head without snout. Ventrals with the first and second rays slightly produced, equal to postorbital part of head or somewhat longer. Caudal rounded. Colour of preserved specimens reddish brown, light below, washed with blue. Orbital rim greenish. Four horizontal rows of light blue spots on body above pectorals. A blue band at base of pectorals. Vertical fins greenish blue. Length 130 mm.

Habitat: Limbe strait; Ambon!; Ceram!; Halmahera. — Philippines. In sea.

Note. This species differs hardly from *C. solorensis* otherwise than in the length of the ventrals. Perhaps they represent females and males of one species, as suggested by P. J. Schmidt (l.c.). Bleeker describes and figures blue margins to the scales of the body behind the pectorals, in the same way as we find them in *solorensis*, but in our specimens of *cyanopleura*, which are smaller, we do not find them. Fowler & Bean (l.c.) also describe these margined scales in *cyanopleura*, but it may be possible that their specimens partly belong to *solorensis*, as they speak of one of their specimens (n° 24138) as having the ventrals produced. Bleeker's specimen, which was longer than ours, seems to be lost. It does not appear in the catalogue of the sale of his collections and is not present in the Leiden Museum. *C. heterodon*, the type of which I examined in the Leiden Museum, where I also saw a specimen, labelled *heterodon* and collected by Hoedt at Ceram, is certainly the same as *cyanopleura*.

2. **Pseudodax** Bleeker

(Bleeker, Versl. Kon. Akad. Wet. Amsterdam XIII, 1862, p. 96)

Somewhat elongate, compressed. Head conical. Body covered with large scales. A sheath of much smaller scales on base of dorsal and anal. Five large scales on base of caudal peduncle, the median one longest. Lateral line continuous. Mouth moderate, not protractile. Maxillary hidden below praeorbital. A pair of spatulate broad incisivi in front part of the upper jaw, opposite to a similar pair in front part of the lower jaw. Behind this pair on each side a much smaller tooth in the lower jaw. Sides of jaws with a trenchant edge, consisting of coalesced teeth. Lips rather thick, plated and with an inner papillated fold. Hind and lower border of praeoperculum finely crenulate, but not denticulated. Six transverse rows of scales on preopercle. Dorsal consisting of XI spines and 12 (13) soft rays. Anal with III spines, the third the longest, and 14 soft rays. Pectorals somewhat pointed. Ventrals much pointed. Caudal rounded.

Distribution: that of the single species known.

1. **Pseudodax moluccanus** (C. V.) (Fig. 6, p. 26)

Odax moluccanus Cuvier & Valenciennes, Hist. Nat. Poissons XIV, 1839, p. 305.
Pseudodax moluccanus Bleeker, Versl. Kon. Akad. Amsterdam XIII, 1862, p. 277. — Atl. Ichth. I, 1862, p. 80.
Pseudodax moluccensis Günther, Cat. Brit. Mus. IV. 1862, p. 208.
Pseudodax moluccensis Cartier, Verh. phys. med. Gesellschaft. Würzburg V, 1874, p. 106.
Pseudodax moluccanus Day, Fishes of India, Prt. III, 1877, p. 409.
Pseudodax moluccanus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 210.
Pseudodax moluccanus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 330.

D. XI. 12 (13). A. III. 14. P. 2.13. V. I. 5. Ll. 32. Ltr. $\begin{array}{c}3\frac{1}{2}\\ \hline 1\\ \hline 11\end{array}$.

Height 2.5—2.7, 2.9—3.2 in length with caudal. Head 3.5, 4—4.2 in length with caudal. Height of head equal to its length. Eye 4.8—5.9, 1.7—2 in snout and 1.2—1.6 in convex interorbital space. Mouth moderate, somewhat oblique. Corner of mouth almost below frontborder of eye. Two large, somewhat spatulate incisivi in front part of upper jaw, opposite to two similar ones in the lower jaw, which are followed by a much smaller incisivus on each side. Behind these teeth a ridge on the sides of both jaws, consisting of coalesced small teeth. Lips rather thick, plated and with an inner papillated fold. Preopercle smooth or finely crenulate along its hind- and lower border. Six transverse rows of scales leave a broad inferior and a less broad posterior limb naked, the posterior limb tapering above. Scales on head beginning on temporal region immediately behind eye, somewhat behind eye on occiput, which is separated by 12 rows of scales from dorsal. Dorsal spines slender, the first equal to eye, the following increasing in length, the last as long as snout. The membranes between the spines not incised. Soft dorsal somewhat higher than spinous part, pointed behind. Anal beginning below 9th or 10th dorsal spines. First anal spine shortest, third longest, longer than eye. Soft anal similar to soft dorsal. Pectorals slightly pointed, subequal to pointed ventrals and as long as head without snout. Caudal rounded. Caudal peduncle short and deep, its least depth equal to snout and eye. Colour of preserved specimens light reddish or brown. Dorsal with a dark narrow border and more or less reticulated with brown. Anal with a broad brown border. Caudal dark brown with a narrow white hindborder. Ventrals dark brown. A dark brown spot at base of pectorals. Length 250 mm.

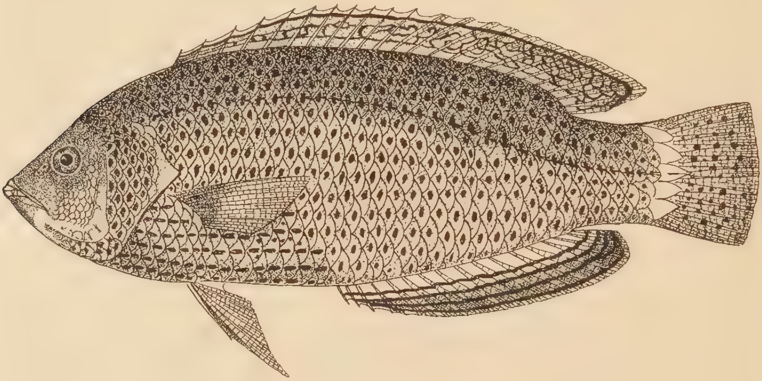

Fig. 6. *Pseudodax moluccanus* (C.V.) × 1/2.

Habitat: Celebes (Makassar, Gulf of Tomini); Dowora; Ambon; Buru; Ceram; New Guinea. — Zanzibar, Réunion, Nikobars, Philippines!. In sea.

3. **Xiphocheilus** Bleeker

(Bleeker, Nat. Tijdschr. Ned. Indië XII, 1856—1857, p. 224)

Oblong. Head deep, specially the cheeks; the corner of the mouth far below horizontal through lower border of eye. Body covered with large scales, small ones in several rows on cheeks. Posterior and inferior limb of preopercle naked. Interopercle scaly. Posterior border of preopercle denticulated or crenulated. Lateral line not interrupted and without sharp bent, running along the upper part of the body and along the middle of the tail. Mouth rather large, moderately protractile. Upper lip thin, sword-like, slipping almost completely below the preorbital when the mouth is closed. Teeth in the upper jaw joined as an osseous ridge. In the lower jaw the posterior teeth are conical and crowded; anteriorly the teeth are coalesced as in the upper jaw. Four canines anteriorly in each jaw. A posterior canine present. Dorsal consisting of XII or XIII spines (seldom XI) and 7—8 soft rays. Anal with III spines and 9—11 soft rays. Dorsal and anal without scaly sheath. Pectorals and ventrals rounded or more or less pointed. Caudal truncate.

Distribution. Only five species, most of them in a few specimens only have been described from the Red Sea, Zanzibar, Mauritius, Ceylon, the Indo-australian Archipelago, the Philippines, and North Australia.

Key to the Indo-australian species of Xiphocheilus

1. Head with light bands. No dark blotches on body . . . . 1. *X. typus* p. 27.
2. Head and body without bands. A dark blotch in lateral line below spinous dorsal and another above lateral line at base of caudal 2. *X. quadrimaculatus* p. 29.

1. **Xiphocheilus typus** Blkr. (Fig. 7, p. 28)

Xiphocheilos typus Bleeker, Nat. Tijdschr. Ned. Indië XII, 1856—1857, p. 224.
Xiphocheilus typus Bleeker, Atl. Ichth. I, 1862, p. 157.

D. XII. 7 (8). A. III. 10. P. 2. 14. V. I. 5. Ll. 27. Ltr. $\begin{array}{c}2\\\hline 1\\\hline 8\end{array}$.

Height 3.4, 4 in length with caudal. Head 3.3, 3.9 in length with caudal, as long as deep. Eye 3.6, more than interorbital space and about equal to snout. Mouth protractile. Maxillary reaching to below posterior part of eye. Canines large, the outer pair much divergent and much larger than the inner pair. A long, slender canine at corner of mouth. Three rows of scales on cheeks. Preopercle finely denticulated behind, its lower and posterior limb naked. Dorsal spines moderate, somewhat increasing in size posteriorly. The first spine equal to eye, the last one somewhat more than snout. The membranes between the spines scarcely incised. Soft dorsal pointed, higher than spinous part, the longest ray almost equal to head without snout. First anal spine more than half length of second. Third spine equal to snout. Soft anal similar to soft dorsal. Pectorals acutely rounded, equal to head without snout. Ventrals pointed, as long as eye and snout together. Caudal somewhat rounded, the angles pointed. Colour olivaceous above, olivaceous pink below, thoracic region orange. Bands on body and fins blue, bordered with violet. Three bands on head, two parallel ones from eye to snout, the upper one united with that of the other side on snout. The third band on head running from corner of mouth to temporal region. Two short oblique white bands on interopercle. About 25—26 oblique narrow bands on body, formed by the light hindborders of the scales. Dorsal hyaline with a pinkish hue, and with 2 or 3 longitudinal light bands. Anal yellowish orange with numerous transverse longer or shorter blue bands. Pectorals and ventrals pinkish orange, the ventrals bordered with blue anteriorly. Caudal yellowish orange, with a median dark transverse band and about 8 narrow light transverse undulating bands. The colour of the preserved specimen is now brownish with an indication of a lighter longitudinal line from opercle to middle of base of caudal. Two chalky-white lines, bordered with darker, on head. One from frontborder of eye to snout and another from corner of mouth, running obliquely upwards below eye to temporal region. Anal with numerous, almost vertical, white stripes. Caudal with vertical light bands, each band bordered by a narrow dark stripe. Length of single specimen known 128 mm. (Type in the British Museum examined).

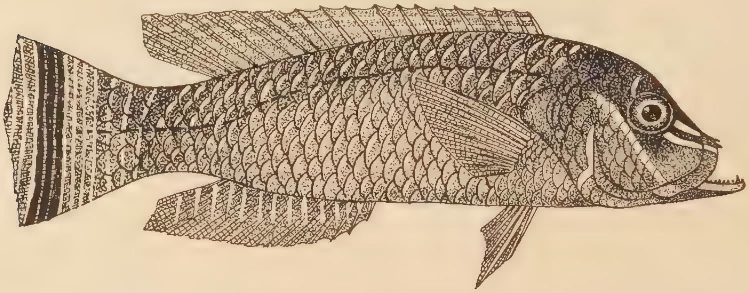

Fig. 7. *Xiphocheilus typus* Blkr. After Bleeker.

Habitat: Nias!. In sea.

2. **Xiphocheilus quadrimaculatus** Gthr.

Xiphocheilus quadrimaculatus Günther, Rep. Challenger I, 1880. Shore Fishes, p. 45.

Xiphocheilus quadrimaculatus Mc Culloch, Austr. Mus. Mem. V, Part II, 1929, p. 321.

Xiphochilus quadrimaculatus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 327.

Xiphocheilus quadrimaculatus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 190.

D. XII. 8. A. III. 9—10. Ll. 27—30. Ltr. $\begin{array}{c}3\\ \hline 1.\\ \hline 6\end{array}$

Height 3.5—4. Head 2.8—3. Eye 3.2—4, 1—1.1. in snout and equal to or somewhat larger than convex interorbital space. Maxillary reaching to or a little beyond frontmargin of eye. Three series of scales on cheeks. Sub- and interopercle scaly. Operculum delated into a large flap. Preorbital as high as the orbit. Dorsal spines rather slender, last spine 3.1—3.2 in head. Second dorsal ray 2.6—3 in head. Third anal spine 3.2—3.6, first anal ray 2.6—3 in head. Pectorals 1.3—1.6, ventrals 1.7—1.8 in head. Largely uniform brownish, fins all pale. Lower surface of head and abdomen pale to whitish. On lateral line and chiefly above to dorsal base, a dusky brown blotch from eighth to tenth scale of its course. Also median caudal rays deep brown, with a still darker small blotch just above end of lateral line. Sometimes a slightly darkened blotch on 3 or 4 scales just before end of curve of lateral line or below front of soft dorsal. Length 100 mm. (After Günther and Fowler & Bean, not seen by us).

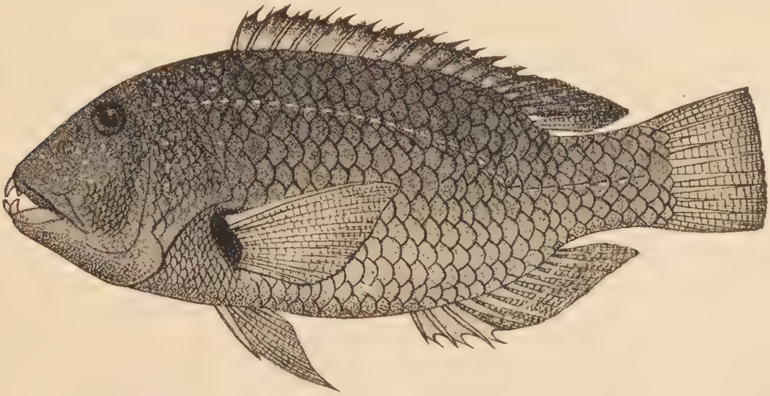

Fig. 8. *Choerodon anchorago* (Bl.). × 1/3. In this specimen the white saddle on the caudal peduncle was not distinct.

Habitat: Arafura Sea. — Philippines. In sea.

4. **Choerodon** Bleeker

(Bleeker, Verh. Bat. Gen. XXII, 1849. Overzicht gladschub. Labroïden, p. 10)

Choerodon Bleeker, Nat. & Geneesk. Arch. II, 1847, p. 513 (nomen nudum).
Choerops Rüppell, Verzeichnis Mus. Senckenberg, naturf. Ges. Samml. IV. Fische. 1852, p. 20.
Cossyphodes Bleeker, Act. Soc. Sc. Indo-Neerl. VIII, 1860. Achtste bijdrage vischfauna Sumatra, p. 37.
Hypsigenys Günther, Ann. Mag. Nat. Hist. (3) VIII, 1861, p. 383.

Oblong, compressed. Head deep, specially the cheeks, the corner of the mouth far below horizontal through lower border of eye. Body covered with large scales. Large scales on opercle, small ones in several series on preopercle, which has the posterior border denticulated or crenulated. Lateral line not interrupted and without sharp bent, running along the upper half of the sides and along the middle of the caudal peduncle. Mouth protractile, the upper lip slipping below the preorbital, when the mouth is closed. Conical teeth in a single row in the jaws, crowded and more or less coalesced into a serrate ridge. Four canines anteriorly in each jaw. A posterior canine present or absent. Dorsal consisting of XII or XIII spines and 6—8 soft rays. Anal with III spines and 8—10 soft rays. A scaly sheath at base of dorsal and anal is more or less developed. Pectorals and ventrals more or less pointed. Caudal truncate.

Distribution: Tropical and subtropical parts of Pacific and tropical parts of Indic.

Note. The oldest name available for this genus is *Choerodon* Bleeker, as has been explained by Gill (Proc. U. S. Nat. Mus. XXXV, 1908, p. 155—156). The citation of Jordan (Genera of Fishes II, 1919, p. 230) is wrong and as it has been copied by others it is necessary to correct it. No mention of *Choerodon* is made in Bleeker's paper cited by Jordan, but the name occurs in the volume of Nat. Geneesk. Arch. cited above, without description or indication of a type however.

Ogilby (Ann. Mag. Nat. Hist. (8) III, 1909, p. 315) apparently not knowing Gill's paper, which had just been published, was of opinion that *Choerodon* could not be used, as Bleeker (Atl. Ichth. l.c.) says that this name "ne pouvait pas être conservé". It is not clear what Bleeker meant by this sentence. The name *Choerodon* is not preoccuped and neither is *Choirodon,* as Bleeker spells it in the passage quoted above.

Key to the Indo-australian species of Choerodon

I. Ventrals not greatly produced, not reaching to anal.
  1. Head and body more elevated. Height 2.4—2.6. Height of head 0.9—1 in its length.
    a. P. 2.13. Brown above, light below. A white saddle on caudal peduncle, reducing the brown colour of upper parts to a narrow stripe on caudal peduncle 1. *Ch. anchorago* p. 31.
    b. P. 2.15—16. Brown above, light below. A large light patch between soft dorsal and lateral line . . . . 2. *Ch. schoenleini* p. 34.
  2. Head and body more elongate. Height 2.5—3.3. Height of head 1.2—1.3 in its length.
    a. Tubes of lateral line simple. White lines on head and white spots on scales of anterior part of body. Height 3.3. . . 3. *Ch. margaritiferus* p. 36.
    b. Tubes of lateral line forked.
      a'. A brown band from axil of pectoral to posterior part of dorsal, widening posteriorly. A broad silvery band above it . . . . 4. *Ch. zosterophorus* p. 36.
      b'. A broad brown band from above end of pectoral to posterior part of dorsal . . . . 5. *Ch. melanostigma* p. 38.
      c'. A large oval black blotch on end of caudal peduncle. A broad blackish band along the middle of the body 6. *Ch. vitta* p. 38.
II. Ventrals greatly produced, reaching on anal in adults. Height 2.8—3. Height of head 1—1.2. A silvery patch in Ll. below 6th—10th spines, with a dark blotch below it . . . . 7. *Ch. oligacanthus* p. 39.

1. **Choerodon anchorago** (Bl.). (Fig. 8, p. 29)

Sparus anchorago Bloch, Naturgesch. Ausl. Fische V, 1791, p. 108.

Labrus macrodontus Lacepède, Hist. Nat. Poissons III, 1802, p. 451, p. 522.

Labrus macrodontus Cuvier & Valenciennes, Hist. Nat. Poissons XIII, 1839, p. 98.

Cossyphus macrodon Bleeker, Verh. Bat. Gen. XXII, 1849. Overzicht Gladsch. Labroïden, p. 10.

Choerops meleagris Rüppell, Samml. Senckenb. Museum, 1852, p. 20.

Crenilabrus leucozona Bleeker, Nat. Tijdschr. Ned. Indië XV, 1858, p. 238.

Cossyphodes macrodon Bleeker, Acta Soc. Sci. Indo-Neerl. VIII, 1860. Dertiende Bijdrage Celebes p. 19.

Hypsigenys macrodon Günther, Ann. Mag. Nat. Hist. 1861, p. 384.

Choerops macrodon Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 297. — Atl. Ichth. I, 1862, p. 162.
Choerops leucozona Bleeker l.c. — ibid. p. 163.
Choerops macrodon Günther, Cat. Brit. Mus. IV, 1862, p. 94.
Choerops leucozona Günther, ibid. p. 95.
Choerops anchorago Günther, l.c.
Choerops macrodon Kner, Fische Novara Exp. II, 1865, p. 248.
Choerops anchorago Peters, Monatsber. Akad. Wiss. Berlin, 1868, p. 270.
Choerops macrodon Steindachner, Sitzb. Akad. Wien LX, 1869, p. 566.
Choerops maeander Cartier, Verh. Ges. Würzburg V, 1874, p. 102.
Choerops anchorago Day, Fishes of India. Prt. 3. 1877, p. 391.
Choerops anchorago Günther, Fische der Südsee II, 1881, p. 238.
Choerops macrodon Macleay, Decr. Cat. Austr. Fish II, 1881, p. 72.
Choerops graphicus De Vis, Proc. Linn. Soc. New S. Wales IX, 1885, p. 878.
Choerops anchorago Jordan & Seale, Bull. Bur. Fish XXVI (1906) 1907, p. 28.
Choirodon anchorago Jordan & Richardson, Bull. Bur. Fish XXVII (1907) 1908, p. 265.
Choerodon weberi Ogilby, Ann. Queensl. Museum X, 1911, p. 52.
Choerodon anchorago Ogilby, Mem. Queensl. Museum II, 1913, p. 93.
Choerops anchorago M. Weber, Siboga Exp. Fische, 1913, p. 362.
Choerodon anchorago Jordan & Starks, Ann. Carnegie Museum XI, Nos. 3—4. 1917, p. 456.
Choerodon anchorago Fowler & Bean, Bull. U. S. Nat. Mus. 100 Vol. VII, 1928, p. 193.
Choerodon anchorago Fowler, Mem. B. P. Bishop Museum X, 1928, p. 327.
Choerodon anchorago P. J. Schmidt, Trans. Pac. Comm. Ac. Sci. USSR, 1930, p. 69.
Choerodon anchorago Whitley, Rec. Austr. Museum XVIII, No. 6. 1932, p. 342.
Chaerops anchorago Borodin, Vanderbilt Marine Mus. I. Art. 3. 1932, p. 94.
Choerodon anchorago Herre, Field Mus. Nat. Hist. Zool. Series XXI, 1936, p. 325.

D. XIII. 7 1). A. III. 8—9. P. 2. 13. V. I. 5. Ll. 29. Ltr. $\begin{array}{c} 2\frac{1}{2} \\ \hline 1 \\ \hline 8-10 \end{array}$.

Height 2.4—2.5, 2.9—3 in length with caudal. Head 2.7—2.8, 3.3—3.5 in length with caudal. Height of head 0.9—1 in its length. Eye 5—6.4, 1.7—2.8 in snout and 1.2—1.7 in slightly convex interorbital space. Mouth slightly oblique, somewhat protactile. Maxillary almost reaching to below posterior nostril. Upper lip strongly plated. Teeth in a single series in the jaws; conical, rounded at the top, crowded, more or less coalescent, forming a serrated ridge. Posteriorly one or two canines in the upper jaw. Anteriorly 4 canines in each jaw, the outer pair curved backwards and outwards. In the upper jaw the inner canines are the longer, in the lower jaw the outer ones. Preorbital and interorbital space naked. Preopercle

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1) Jordan & Starks, l.c., record a specimen with XII spines.

with a finely denticulate hindborder in young, feebly crenulate in adults and with about 10 transverse rows of small scales. Posterior and inferior preopercular limb naked. Operculum and interoperculum with larger scales. Scales beginning on nape in vertical through hindborder of preopercle. About 8 rows of scales before dorsal. Dorsal spines short but strong, stiff and pungent, their membranes strongly incised and produced beyond each spine into a streamer-like filament. First spine without its filament about equal to eye, second and third somewhat longer, the following slightly decreasing in size. Soft dorsal pointed behind, the posterior rays much longer than the anterior ones and almost as long as snout. First anal spine half as long as second; third longest, about one eye-diameter and a half. Anal moderately pointed behind, the rays longer than the spines and almost equal to snout. Pectorals triangular, with the hindborder rounded, equal to distance between corner of mouth and tip of opercular flap. Ventrals pointed, the first ray slightly produced, equal to eye and snout together. Caudal truncate. Colour of preserved specimens brown above, white or creamy below. Sides of head and back with numerous white specks. A transverse white band, beginning on lateral line below 5th and 6th dorsal spines, in young ones sometimes continued upwards to dorsal or even on that fin. A white saddle on caudal peduncle and below posterior dorsal rays, reducing the brown colour of the upper parts to a narrow stripe on caudal peduncle, running along the lateral line. Dorsal brownish with an ill-defined white longitudinal band; posterior part of dorsal above the white saddle also white. Anal, caudal, pectorals and ventrals creamy white or hyaline. Base of pectorals dark brown, forming a band. In small specimens there is often a brown blotch at base of ventrals and a brown band along base of anal. The specimen of 44 mm described by Bleeker as *leucozona,* which shows several white longitudinal bands, is the juvenile stage of this species. In a specimen of 76 mm. I still find traces of these bands and in a specimen of 90 mm there is still a trace of a band on the caudal peduncle. Length 310 mm.

Nomen indig.: Ikan gigi andjing (Malay Batavia).

Habitat: Singapore; Simalur!; Sumatra (Telokbetong); Bintang; Biliton; Java (Batavia!); Bawean; Borneo (Sadong, Sandakan); Sulu Islands!; Celebes (Makassar!, Menado, Cape Kait); Saleyer!; Sumbawa; Ternate; Batjan; Ceram!; Timor; Kei Islands!; Aru Islands; New Guinea (Rubi, Port Moresby). —

Ceylon, Andamans, Japan?, Riu Kiu Islands, Philippines!, Pelew Islands, Yap, Solomon Islands, New Hannover, New Caledonia, Queensland, Tahiti, Hawaii. In sea.

2. **Choerodon schoenleini** (C. V.)

Cossyphus Schoenleinii Cuvier & Valenciennes, Hist. Nat. Poissons XIII, 1839, p. 143.
Cossyphus cyanostolus Richardson, Rep. 15th meeting Br. Assoc. 1846 Ichth. China, p. 256.
Cossyphus ommopterus Richardson, ibid. p. 257.
Cossyphus Schoenleinii Bleeker, Nat. Tijdschr. Ned. Indië VII, 1854, p. 252.
Hypsigenys ommopterus Günther, Ann. Mag. Nat. Hist. VIII, 1861, p. 384.
Choerops Schoenleinii Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 297. — Atl. Ichth. I, 1862, p. 163.
Choerops ommopterus Günther, Cat. Brit. Mus. IV, 1862, p. 94.
Choerops notatus Alleyne & Macleay, Proc. Linn. Soc. New S. Wales I, 1877, p. 344.
Choerops schönlinii Macleay, ibid. II, 1878, p. 362 (errore).
Chaerops ommopterus Macleay, Descr. Cat. Austr. Fish II, 1881, p. 72.
Choerops cyanostolus Jordan & Seale, Bull. Bur. Fish. XXV (1905) 1906, p. 292.
Choerodon schoenleinii Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 198.
Choerodon schoenleinii Fowler, Mem. B. P. Bishop Museum X, 1928, p. 327.
Choerodon schoenleinii Whitley, Rec. South Austr. Museum V, 1935, p. 350.

D. XIII (rarely XII). 7 (8). A. III. 9—10. P. 2.15—16. V. I. 5. Ll. 28—29. Ltr. $\begin{array}{c} 3\frac{1}{2}-4\frac{1}{2} \\ \hline 1 \\ \hline 10 \end{array}$.

Height 2.4—2.6, 2.9—3.1 in length with caudal. Head 3—3.3, 3.7—4 in length with caudal. Height of head 0.9 in its length. Eye 3.5—5.3, 1.3—2.3 in snout and 1.4—1.5 in somewhat convex interorbital space. Mouth slightly oblique, somewhat protractile. Maxillary reaching to below frontborder of eye in adults. Upper lip strongly plated. Teeth in the jaws in a single series, coalescent into a serrated ridge. No posterior canines in the upper jaw. Four moderate curved canines anteriorly in each jaw, the inner pair in the upper jaw longer than the outer one; those in the lower jaw subequal. Preorbital and interorbital space naked. Preopercle denticulate along its hindborder, more so in young than in adults and with about 8—9 transverse rows of small rounded scales; the posterior and inferior limb naked. Opercle with larger scales. A few scales on interopercle. Scales beginning on nape above vertical through hindborder of preopercle. About 7 rows of scales before dorsal. Dorsal spines slender, but stiff and pungent; the first somewhat longer than eye. Spines increasing in length to the 5th, which is more than twice eye and not much longer than the following. Last dorsal spine somewhat more than eye. Membranes between the spines incised, and produced beyond the spines into a streamer-like filament. Soft dorsal somewhat pointed behind, the longest ray as long as snout or somewhat longer. First anal spine half length of second; third longest, nearly twice eye. Soft anal similar to soft dorsal. Pectorals broad at base, pointed, the hindmargin rounded, almost as long as head. Ventrals somewhat pointed, equal to eye and snout together or somewhat longer. Caudal truncate. Colour of preserved specimens reddish brown, lighter below. Light bluish or dark brown stripes on head. One or two from frontborder of eye to upper lip; one from chin over lower limb of preopercle to posterior border of interopercle. Another vertical one, along hindborder of opercle. Three from hindborder of eye, more or less broken into spots, to upper and middle part of opercle. A similar band below base of pectoral. Most scales of body with similar light blue or dark brown spots or vertical stripes. All these stripes and spots not always conspicuous. Scales of dorsal sheath below three posterior spines dark brown, forming a conspicuous spot (according to Bleeker sometimes wanting). A large light patch between soft dorsal and lateral line. Dorsal with an indistinct light band and some spots posteriorly. Anal white, with a greyish subbasal longitudinal band, and two or three longitudinal rows of greyish spots distally. Vertical rows of similar spots on caudal. Pectorals and ventrals yellowish. Colour of a fresh specimen: Head and body greenish olive above, sides and belly sulphur yellow. Cobalt blue ring round eye. Violet blue stripe from eye to symphysis of upper jaw, which is also blue, the stripe continued in green colour on teeth. A shorter stripe below the first, only a few mm long, but continued from below eye to upper border of opercle and ending in a blue patch above gill-opening. Teeth of lower jaw green. A light violet stripe along lower jaw, continued from corner of mouth over interopercle. Three similar stripes on chin. Hindborder of opercle light blue. Scales of back and sides with light blue spots, fused into stripes on tail, but again broken into spots on caudal peduncle and on caudal fin. A dark blue patch immediately below posterior dorsal spines. Posteriorly and lower down a light green indistinct patch. Dorsal with a light blue band. Length 490 mm.

Nomen indig.: Dava-dava (Port Moresby).

Habitat: Pulu Weh!; Singapore; Sumatra (Padang); Java;

Borneo (Sandakan); Celebes (Makassar!, Menado); Sulu Islands!; Ambon!; Batjan; Aru Islands!; Arafura Sea; New Guinea (Port Moresby). — China!, Philippines!, Australia. In sea.

3. **Choerodon margaritiferus** Fowler & Bean

Choerodon margaritiferus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 197.

D. XII. 8. A. III. 9. Ll. 29. Ltr. $\begin{array}{c}4\\\hline 1\\\hline 8\end{array}$.

Height $3^{1}/_{3}$. Head $2^{3}/_{5}$. Eye 5, $1^{4}/_{5}$ in snout, $1^{2}/_{5}$ in interorbital, which is slightly depressed, only little elevated. Maxillary reaches $^{3}/_{4}$ to eye, concealed, length $3^{3}/_{5}$ in head. Four front canines in each jaw, outer one each side flares backward. Lateral line of simple, slender, well exposed tubes. Three or four rows of scales across cheek to angle of preopercular ridge; cheek scaleless anteriorly and on preopercle flange; 7 rows of scales before dorsal. Dorsal spines stiff, last $4^{1}/_{6}$ in head, fifth ray 4. Dull brown generally, paler to whitish below. Gray white line from snout tip to lower edge and on postocular broken as row of small white spots to white blotch in pectoral axil and white bar across pectoral base; also above on postocular another similar whitish streak, broken as spots or dots on opercle; they appear as if continued on upper front side of back far as depressed pectoral fin and those from pectoral axil back till above middle of anal base as small white spot on each scale. Scales along dorsal bases and upper edge of caudal peduncle, also band along straight section of lateral line medially on caudal peduncle and caudal base, whitish. Dorsal and anal whitish. Length 135 mm (After Fowler & Bean, not seen by us).

Habitat: Sulu Islands.

Note. In colour this species shows resemblance to *Ch. schoenleini*, but it seems to be much more slender and the tubes of the lateral line are described as simple.

4. **Choerodon zosterophorus** (Blkr.)

Choerops zosterophorus Bleeker, Arch. Neerl. Sc. Nat. III, 1868, p. 273.
Choerops Brenchleyi Günther, Ann. Mag. Nat. Hist. (4) X, 1872, p. 424. — Brenchley's Cruise of the Curaçao, 1873, p. 426.

D. XIII. 7. A. III. 9—10. P. 2.13. V. I. 5. Ll. 29. Ltr. $\begin{array}{c}2—2\frac{1}{2}\\\hline 1\\\hline 8\end{array}$.

Height 3.1—3.2, 3.7 in length with caudal. Head 2.9, 3.4 in length with caudal. Height of head 1.3 in its length. Eye 4.4, 1.3 in snout and 1.3 in slightly convex interorbital space. Mouth somewhat oblique, maxillary reaching to below frontborder of eye. Teeth in the jaws confluent into a sharp ridge, only posteriorly a few distinct pointed teeth in the lower jaw and a moderate canine posteriorly in the upper jaw. On the labial side of the ridge two curved canines anteriorly in the upper jaw and a much smaller one on each side at some distance from the anterior ones. In the lower jaw four canines anteriorly, the outer pair longer than the inner pair and tusk-like. Preopercle with the posterior border very finely denticulate and with three transverse rows of small scales. Posterior and inferior preopercular limb naked. One longitudinal row of scales on interopercle. Opercle with larger scales. About 7 rows of scales before dorsal. Scales beginning on head in vertical through hindborder of preopercle. A patch of scales in temporal region. First dorsal spine three fourths of eye, following spines increasing in length to the seventh, which is as long as snout. Posterior spines only slightly lower. The membranes between the spines slightly incised and produced beyond each spine into a short filament. Soft dorsal of about the same height as the spinous part, the fin pointed behind. First anal spine about half length of second; third longest, as long as eye. Soft anal similar to soft dorsal. Pectorals with a rather broad base, moderately pointed, their hindborder almost straight, equal to head without snout. Ventrals pointed, the first ray slightly produced, about half diameter of eye shorter than pectorals. Caudal truncate, with the upper and lower rays slightly produced. Colour of preserved specimen salmon, darker on back. A brown band from axil of pectoral to posterior part of dorsal, widening here into a large and still darker patch, covering the sheath and the base of the dorsal fin between the 10th spine and the 4th ray. Above this band a broad silvery band, running from above axil of pectoral to below posterior spines of dorsal, but not reaching that fin, as it is separated from it by the dark patch just mentioned; this dark patch continued faintly along base of fin anteriorly and sending a narrow branch downward which borders the upper margin of the silvery band. A few scales on back of middle of caudal peduncle dark brown. Head with an indistinct light band from eye to upper lip, which is also light as well as the chin. The lower lip however is brown. Dorsal whitish, with two indistinct darker longitudinal bands, the lower of which fuses posteriorly in the dark patch already mentioned. Anal and caudal whitish. Paired fins hyaline. Length 187 mm.

Habitat: Misol; Kei Islands?. — Philippines. In sea.

5. **Choerodon melanostigma** Fowler & Bean

Choerodon melanostigma Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 199. Pl. 16.
Choerodon melanostigma Herre, Notes on Fishes Zool. Mus. Stanf. Univ. I, 1931, p. 72.

D. XII. 8. A. III. 10. P. 2.14? V. I. 5. Ll. 29. Ltr. $\begin{array}{c}3\frac{1}{2}\\\hline 1\\\hline 9\end{array}$.

Height $2^{1}/_{2}$—$2^{3}/_{4}$. Head $2^{2}/_{3}$—3. Height of head 1.2 in its length. Eye $3^{4}/_{5}$—$4^{7}/_{8}$, $1^{2}/_{5}$—2 in snout and 1—$1^{2}/_{5}$ in convex interorbital space. Mouth somewhat oblique. Teeth in jaws confluent into a smooth bony ridge. Four canines anteriorly in each jaw, outer lower ones flaring outward on each side. Five or six transverse rows of scales on cheeks. Posterior and inferior preopercular limb naked. Dorsal spines gently increasing in size posteriorly. Last spine $2^{3}/_{5}$—3 in head. Soft dorsal of about the same height as spinous part, rounded behind. Third anal spine longest, 3—$3^{2}/_{5}$ in head. Soft anal similar to soft dorsal. Pectorals $1^{1}/_{8}$—$1^{1}/_{3}$, ventrals $1^{1}/_{2}$—$1^{3}/_{4}$ in head. Caudal slightly concave behind, little convex as expanded. Pale brown generally. Pale gray line from below hind nostril to eye, another along lower eye edge back to preopercle edge; small gray spot close behind eye and another along upper hind eye edge. Deep brown or blackish blotch from level with median axis of body obliquely up across lateral line to base of soft dorsal. Anterior to dark blotch, and posteriorly, pale yellowish tinge. Fins all pale, like body. In small example blue-gray spots less developed about eye. Length 208 mm (After Fowler & Bean, not seen by us).

Habitat: Sulu Islands.

Note. I have made the description after that of Fowler & Bean and after their figure of the fish. As already mentioned by the authors, it is related to *Choerodon jordani* Snyder from the Riu-Kiu Islands, differing in coloration. It shows still more likeness to *Ch. zosterophorus* Blkr. and it is possibly only a colour variation of that species.

6. **Choerodon vitta** Ogilby

Choerodon vitta Ogilby, Proc. Roy. Soc. Queensl. XXIII, 1910, p. 13.
Choerodon vitta Whitley, Rec. Austr. Mus. XVIII. No. 6, 1932, p. 342.

D. XIII. 7. A. III. 10. P. 16. Ll. 27—29. Ltr. $\begin{array}{c}3\\\hline 1\\\hline 10\end{array}$.

Dorsal profile of body evenly and gently rounded, not appreciably higher than the ventral profile, its highest point above the middle of the appressed pectoral. Height 2.9. Head 3.15, one sixth longer than deep. Upper profile of snout gently rounded and moderately declivous. Eye 4.1, moderate, its diameter rather less than the depth of the preorbital. Cleft of mouth extending to below the anterior nostril. Anterior canines large; lateral tusks in the lower jaw flared upwards and outwards; lateral mandibular teeth without prominent tips. No posterior canine. Length of snout 2.45, width of interorbital 3.5 in length of head. Preopercle finely serrated. Cheeks with eight series of small subimbricate scales; some of the opercular scales larger than the breast-scales; scales at the base of the caudal angulated and but little enlarged. Last dorsal spine 3.05, last anal spine 2.9 in length of head. Soft dorsal and anal fins low, rounded and subequal in height posteriorly, scarcely extending to the caudal fin, and with a low scaly sheath. Pectorals evenly rounded. Ventrals with the outer ray longest, extending to vent, but not to anal. Pectorals and ventrals 4.5 in length of body. Caudal fin emarginate. Reddish brown, darkest above: two to four narrow, sometimes anastomosing, silvery lines on the cheeks and preorbitals. According to Whitley an indistinct oblique band below eye. A broad blackish band along the middle of the body from behind eye to the caudal peduncle, separated by a short interspace from a large oval black blotch in front of the root of the caudal; fins uniform pale rufous. Length 190 mm (After Ogilby and Whitley, not seen by us).

Habitat: Aru Islands.

7. **Choerodon oligacanthus** (Blkr.)

Crenilabrus oligacanthus Bleeker, Nat. Tijdschr. Ned. Indië II, 1851, p. 489. — ibid. III, 1852, p. 68.
Hypsigenys oligacanthus Günther, Ann. Mag. Nat. Hist. (3) VIII, 1861, p. 384.
Choerops oligacanthus Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 297. — Atl. Ichth. I, 1862, p. 164.
Choerops oligacanthus Günther, Cat. Brit. Mus. IV, 1862, p. 96.
Choerodon palawanensis Seale, Philip. Journ. Science IV (A), 1909, p. 523.
Choerodon oligacanthus Seale, ibid. V. No. 4. 1910, p. 281.
Choerodon (*Macrochoerodon*) *oligacanthus* Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 200.

D. XIII. 6—7 (8). A. III. 10. P. 2. 14. V. I. 5. Ll. 29. Ltr. $\begin{array}{c}3-3\frac{1}{2}\\ \hline 1\\ 9\end{array}$.

Height 2.8—3, 3.3—3.6 in length with caudal. Head 3—3.3, 3.5—4 in length with caudal. Height of head 1—1.2 in its length.

Eye 4.2—6.6, 1.5—3 in snout and 1—1.4 in somewhat convex interorbital space. Mouth somewhat oblique, maxillary reaching to below anterior nostril. Upper lip plated. Teeth in the jaws coalesced into a sharp, more or less crenulated ridge, with three caninoid teeth posteriorly in the upper jaw; in young specimens these caninoids are wanting and the teeth in the jaws are less confluent, especially in the lower jaw. On the labial side of the ridge four canines anteriorly in each jaw, the outer pair of the lower jaw and the inner pair of the upper jaw longer than the others. The outer pair in the lower jaw slightly curved outwards. Preopercle with 7—8 transverse rows of small scales, the posterior and inferior limb naked, the posterior border distinctly denticulated. Scales on opercle and interopercle, the last in one transverse row, larger than those of preopercle. Scales on upper part of head beginning above hindborder of eye, about 10 rows before dorsal, the three anterior rows consisting of much smaller scales and separated by a more or less scaleless interspace from those behind. Dorsal spines stiff and pungent; first somewhat more than eye, the following increasing in length posteriorly; the posterior ones subequal, about twice eye. The membranes between the spines slightly incised. Soft dorsal of about the same height as spinous part, pointed behind in adults, more rounded in young. First anal spine about two thirds of second; third spine longest, nearly twice eye. Soft anal similar to soft dorsal. Pectorals slightly pointed, equal to distance between corner of mouth and opercular flap. Ventrals with the first and second rays much produced, as long as pectorals in young, longer than pectorals in adults and reaching on anal. Colour of preserved specimens reddish brown above, yellowish below. A large elongate more or less silvery patch in lateral line below 6th—10th dorsal spines. A dark brown round or more elongate patch immediately below its anterior part. A similar but smaller dark patch between lateral line and last dorsal ray. In young specimens a third dark patch in lateral line below last dorsal spine. Two white transverse bands on chin. An indistinct rather broad light band from eye to corner of mouth and sometimes a fainter band before it. Dorsal and anal with oblique narrow dark bands or rows of spots, caudal with similar vertical bands; the markings of these fins not always distinct. Pectorals and ventrals yellowish, hyaline. Colour of a fresh specimen: Teeth bluish green, hindborder of opercle blue. Back grey, sides more or less orange, with light grey longitudinal stripes. A sulphur yellow patch below 6th—11th dorsal spines, before it and below the lateral line a black patch, indistinctly prolonged posteriorly. A black patch between lateral line and end of dorsal. Spinous part of dorsal orange, anal light blue with yellowish spots. Caudal with irregular vertical blue stripes. Length 282 mm.

Nom. indig.: Semetjo (Bintang). Batu (Balikpapan).

Habitat: Pulu Weh!; Singapore!; Bintang; Banka; Borneo (Balikpapan!, Sandakan!); Sulu Islands!; Celebes (Makassar!, Badjoa). — Malacca, Philippines, New Caledonia. In sea.

5. **Bodianus** Bloch

(Bloch, Ausl. Fische IV, 1790, p. 31)

Harpe Lacepède, Hist. Nat. Poissons IV, 1803, p. 426.
Cossyphus Cuvier & Valenciennes, Hist. Nat. Poissons XIII, 1839, p. 102.
Lepidaplois Gill, Proc. Acad. Nat. Sci. Philadelphia XIV, 1862, p. 140. — ibid. XV, 1863, p. 222.
Euhypsocara Gill, ibid. 1863, p. 222.
Gymnopropoma Gill, l.c.
Verreo Jordan & Snyder, Proc. U. S. Nat. Mus. XXIV, 1902, p. 619.

Oblong, compressed. Head pointed or obtuse. Body covered with large or moderate scales. Scales on opercle and smaller ones in several series on cheeks and preopercle, the hindborder of which is denticulate or crenulate. Lateral line not interrupted and without a sharp bent, running along the upper part of the sides and the middle of the tail. Mouth protractile, upper lip exposed when the mouth is closed. Conical or rounded teeth in a single series in the jaws, more or less coalesced into a sharp ridge. Four canines anteriorly in each jaw. A posterior canine present. Dorsal consisting of XII spines and 9—11 soft rays. Anal with III spines and 10—13 soft rays. Base of dorsal and anal scaly. Pectorals rounded, ventrals pointed. Caudal truncate, the outer rays more or less produced.

Distribution: Tropical parts of Indic and West Atlantic, tropical and subtropical parts of Pacific.

Note. Gill grouped the species, which Cuvier & Valenciennes and Bleeker and Günther after them, had united in the genus *Cossyphus,* in several genera, but the characteristics on which they were based, viz. the dorsal and anal being produced into falciform lobes or not, the limb of the preopercle being scaly or naked, the snout being obtuse or pointed, are according to me of subgeneric value only. *Cossyphus* however being preoccupied, can not be retained for this genus. The oldest name available is *Bodianus* Bloch. Although Bloch described several species belonging to very different families under this name, the type of the genus is *Bodianus bodianus* Bl. (= *Labrus rufus* L. = *Cossyphus bodianus* C. V.) by tautonomy according to the international rules of nomenclature. Bleeker came apparently to that opinion in later years, for in 1878 he records *Cossyphus mesothorax* in a list of the fishes known from New Guinea as *Bodianus mesothorax* (see synonymy of that species).

Key to the Indo-australian species of Bodianus

A. Preopercular limb scaly.
  a. Head pointed, its height 1.3—1.4 in its length (*Lepidaplois*).
    1. Scales on head beginning between anterior nostrils. An oblique band from above black pectoral axil to 8th—10th dorsal spines . . 1. *B. mesothorax* p. 42.
    2. Scales on head beginning above middle of eyes. Scales of posterior part of back with dark spots. A large dark blotch on middle of 4 anterior anal rays. Black spot behind dorsal and anal and on posterior end of lateral line. Three or four white spots between dorsal and lateral line . . . . . 2. *B. diana* p. 44.
  b. Head obtuse, its height 1.1 in its length. A curved band from sides to, and on last dorsal spines. Upper and lower lobe of caudal with a dark band, continued on caudal peduncle (*Euhypsocara*) . . . . 3. *B. anthioides* p. 46.
B. Preopercular limb naked. (*Gymnopropoma*).
  a. A large oblong black blotch between base of soft dorsal and lateral line. Dorsal with a black blotch between anterior spines . . . . 4. *B. bilunulatus* p. 47.
  b. Dorsal with a black blotch between median dorsal spines. Body uniform . . . . 5. *B. oxycephalus* p. 48.

1. **Bodianus mesothorax** (Bl. Schn.)

Labrus mesothorax Bloch, Schneider, Syst. Ichth. 1801, p. 254.
Cossyphus mesothorax Cuvier & Valenciennes, Hist. Nat. Poissons XIII, 1839, p. 129.
Cossyphus mesothorax Bleeker, Verh. Bat. Gen. XXII, 1849. Overz. Gladsch. Labr. p. 13. — Atl. Ichth. I, 1862, p. 159.
Cossyphus mesothorax Günther, Cat. Brit. Mus. IV, 1862, p. 103.
Bodianus mesothorax Bleeker, Arch. Neerl. Sci. Nat. XIII, 1878, p. 41.
Lepidaplois mesothorax Ogilby, Mem. Queensl. Mus. V, 1916, p. 184.
Lepidaplois mesothorax Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 328.
Lepidaplois mesothorax Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII. 1928, p. 202.

D. XII. 10 (11). A. III. 12. P. 2. 14. V. I. 5. Ll. 32—33.

Ltr. $\begin{array}{c} 4\frac{1}{2}-5 \\ \hline 1 \\ \hline 10-12 \end{array}$.

Height 2.8—3.2, 3.4—3.8 in length with caudal. Head 2.9—3, 3.5—3.7 in length with caudal. Height of head 1.3—1.4 in its length. Eye 4.7—4.9, 1.5 in snout and 1.1—1.2 in slightly convex interorbital space. Mouth nearly horizontal. Maxillary reaching to below frontborder of eye. Lips plated. Conical, crowded, more or less coalesced teeth in a single row in the jaws. A canine posteriorly in the upper jaw; four canines anteriorly in each jaw, those in the upper jaw subequal in length; in the lower jaw the inner pair is much smaller than the outer pair. Head scaly, with exception of the snout. About 8 transverse rows of scales on cheeks, covering preopercular limb. On the upper part of the head the scales begin between the anterior nostrils; from here to origin of dorsal about 30 rows of scales. Opercle, subopercle and interopercle scaly. Hindborder of preopercle finely denticulated. Dorsal spines strong, stiff and pungent, the membranes between them deeply incised and more or less streamer-like produced beyond the spines. First spine less than eye, following increasing in length to the 12th spine, which is nearly twice eye. Soft dorsal rounded, as high as posterior part of spinous dorsal. Anal spines strong; the first equal to eye, second to snout, and third to snout and eye together. Soft anal truncate, the last ray the shortest, the first ray as long as the third spine. Pectorals equal to head without snout. Ventrals, with the first and second rays somewhat produced, scarcely shorter. Caudal truncate. Colour of preserved specimens dark reddish brown on upper part and sides of head, and on anterior part of back and sides of body; the rest of the back and the sides and the lower parts light reddish brown or yellowish, the two colours separated by a purplish black stripe from corner of mouth to end of subopercle and by a very broad oblique band of the same colour beginning above axil of pectoral, which is deep black, and running obliquely upwards to back and continued on 8th—10th dorsal spines. Base of pectoral black, forming one black patch with the dark axil. A blackish patch between 1st—3rd dorsal spines. Colour of the dorsal otherwise as that of the back below it: dark brown anteriorly, then black, and then light reddish brown, but the two last dorsal spines are black at the tip, the black colour confluent with that of the preceding spines. All other fins light reddish brown. Length 193 mm. (Specimens of Bleeker's collection in the Amsterdam Museum seen by us).

Nomen indig.: Bajam (Malay Sumatra).

Habitat: Sumatra (Padang, Priaman); Java (Batavia!); Celebes (Limbe Strait, Binang Unang); Sulu Islands; Ternate; Tidore; Batjan; Buru; Ceram; Ambon; New Guinea. — China, Philippines!, Queensland. In sea.

2. **Bodianus diana** (Lac.), (Fig. 9, p. 45)

Labrus diana Lacepède, Hist. Nat. Poissons III, 1802, p. 450.
Cossyphus diana Cuvier & Valenciennes, Hist. Nat. Poissons XIII, 1839, p. 127.
Cossyphus diana Bleeker, Nat. Tijdschr. Ned. Indië VII, 1854, p. 86. — Versl. Akad. Amsterdam. XIII, 1862, p. 296. — Atl. Ichth. I. 1862, p. 159.
Cossyphus diana Günther, Cat. Brit. Mus. IV, 1862, p. 104. — Fishes of Zanzibar, 1866, p. 87.
Cossyphus diana Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 549.
Cossyphus diana Day, Fishes of India. Prt. 3. 1877, p. 392.
Cossyphus diana M. Weber, Siboga Exp. Fische. 1913, p. 362.
Lepidaplois diana Jordan & Starks, Ann. Carnegie Mus. XI. Nos 3—4. 1917, p. 456.
Lepidaplois diana Barnard, Ann. S. Afric. Mus. XXI, 1925—1927, p. 745.
Lepidaplois diana Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 204.

D. XII. 9 (10)—10 (11). A. III. 10 (11)—12 (13). P. 2. 14. V. I. 5. Ll. 31. Ltr. $\begin{array}{c}4\frac{1}{2}\\ \hline 1\\ \hline 11\end{array}$.

Height 3—3.1, 3.5—3.6 in length with caudal. Head 2.8—3, 3.3—3.6 in length with caudal. Height of head 1.3—1.4 in its length. Head pointed, the upper profile slightly concave. Eye 4.9—6.3, 1.7—2.3 in snout and 1—1.4 in almost flat interorbital space. Mouth large, somewhat protractile, slightly oblique. Upper lip plated. Maxillary reaching to below posterior nostril. Teeth in the jaws in a single row, confluent, forming a ridge, but the individual teeth remain visible. A canine posteriorly at corner of mouth. Four canines in each jaw anteriorly, the inner pair in the lower jaw much shorter than the others. Lower jaw slightly prominent. About 10 transverse rows of scales on cheeks; a few scales on posterior part of lower jaw. Preopercular limb scaly. Hindborder of preopercle very finely denticulated. Interopercle and subopercle covered with scales; those of opercle large. Scales on upper part of head beginning above middle of eyes. About 19 rows of scales before dorsal, the 10—11 anterior rows consisting of small scales. Dorsal spines short, stiff and pungent, the membranes between the spines deeply incised. First spine somewhat less than eye, following gradually increasing in length to the last, which is equal to one eye diameter and a half. Scaly sheath of dorsal increasing in height posteriorly. Soft dorsal rounded behind, as high as posterior part of spinous part. First anal spine more than half length of second; third longest, equal to snout. Soft anal slightly rounded, the longest rays as long as longest rays of dorsal. Pectorals equal to head without snout or somewhat longer. Ventrals without produced rays, slightly longer than snout. Caudal truncate, somewhat rounded when expanded. Colour of preserved specimens pinkish. Scales of the body with a reddish brown hindborder, forming large spots on posterior part of back and on upper part of caudal peduncle, as well as on scales of dorsal sheath. Scales of belly with a more or less distinct yellowish or pearly centre. Three or four chalky white spots on upper part of sides, above lateral line, the first (if present) before dorsal, the second and third below spinous and the fourth below soft dorsal. Sometimes also a white spot at origin of dorsal. A brown spot at posterior end of lateral line. On caudal peduncle a spot immediately behind dorsal and anal, lastnamed also spreading on base of last anal rays. A large dark brown oval blotch on middle of 4 anterior anal rays. A bluish spot on anus. Membranes between 1st—3rd dorsal spines dark brown. Ventrals crossed by a broad dark brown bar. Otherwise the fins are yellowish or pinkish. Length 200 mm.

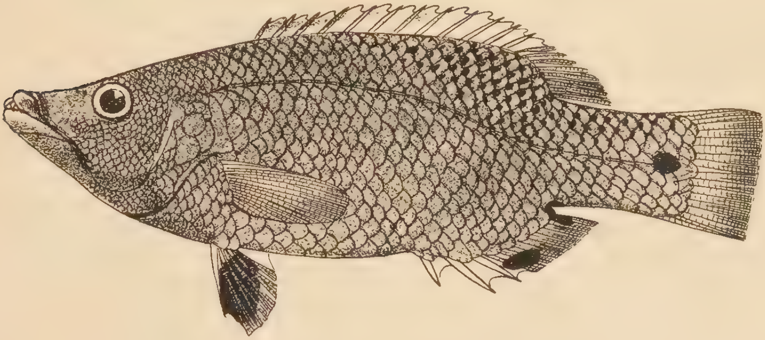

Fig. 9. *Bodianus diana* (Lac.) × 3/5.

Nomen indig.: Toka (Malay, Bintang).

Habitat: Sumatra (Priaman); Bintang; Celebes (Makassar); Sulu Islands!; Batjan; Gomomo Island; Buru; Ambon; Banda!. — Coast of Natal, Mozambique, Zanzibar, Réunion, Mauritius, Red Sea, coast of British India, Ceylon, Philippines. In sea.

3. **Bodianus anthioides** (Benn.)

Crenilabrus anthioides Bennett, Proc. Comm. Zool. Soc. London I, 1830—1831, p. 167.

Cossyphus zosterophorus Bleeker, Acta. Soc. Sci. Indo. Neerl. II, 1857. Achtste bijdr. vischf. Amboina, p. 75.

Cossyphus anthioides Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 296. — Atl. Ichth. I, 1862, p. 160.

Cossyphus anthioides Günther, Cat. Brit. Mus. IV, 1862, p. 106, p. 506.

D. XII. 10. A. III. 12. P. 2.14. V. I. 5. Ll. 32—33. Ltr. $\begin{array}{c}4-4\frac{1}{2}\\ \hline 1\\ \hline 12-13\end{array}$.

Height 2.5—2.8, 3.5 in length with caudal. Head 3.2—3.3, 4.2—4.4 in length with caudal. Height of head 1.1 in its length. Eye 4.3—4.7, 1.3—1.4 in snout and 1.4 in convex interorbital space. Mouth almost horizontal. Maxillary hidden posteriorly below preorbital. Corner of mouth below vertical through anterior border of eye. Conical teeth in a single row in the jaws, four canines anteriorly in each jaw, the outer ones in the upper jaw longer than the inner pair and curved outwards: the inner pair in the lower jaw smaller than the outer pair, fitting between the inner pair of the upper jaw, when the mouth is closed. Scales on head small, beginning anteriorly between the nostrils. Preorbital also scaly. About 9—10 transverse rows of scales on preopercle; preopercular limb scaly. Scales on opercle and those between nape and origin of dorsal large. First dorsal spine equal to eye, penultimate spine a little longer, last spine equal to eye and snout together. Soft dorsal pointed, the longest ray almost equal to head without snout. First anal spine as long as first dorsal spine. Third anal spine longest and equal to eye and snout together. Soft anal rounded, the first rays longest, not much longer than third spine. Following anal rays gently decreasing in size posteriorly. Caudal falcate, the lobes produced. Pectorals equal to head without snout, ventrals half diameter of eye shorter. Colour of preserved specimens yellowish. A reddish brown band, its origin covered by middle of pectoral, running obliquely posteriorly in a curve to base of posterior dorsal spines and anterior rays and continued on that fin. Lobes of caudal reddish brown, the colour continued anteriorly as a superior and an inferior band on caudal peduncle. Scaly base of anal also dark. Irregularly arranged dark spots on sides, behind the transverse band. A black spot between first and third dorsal spines. A light reddish brown blotch in the middle of the anterior part of the soft anal may be present. Fins otherwise yellowish. Length 210 mm (Specimens of Bleeker's collection in the Leiden Museum examined).

Habitat: Ambon!; Misol. — Mauritius. In sea.

4. **Bodianus bilunulatus** (Lac.)

Labrus bilunulatus Lacepède, Hist. Nat. Poissons III, 1802, p. 454.
Cossyphus bilunulatus Cuvier & Valenciennes, Hist. Nat. Poissons XIII, 1839, p. 121.
Cossyphus bilunulatus Richardson, Rep. 15th. Meeting Brit. Ass. Ichth. China, 1845, p. 256.
Cossyphus bilunulatus Bleeker, Acta Soc. Sc. Indo-Neerl. III, 1858. Negende bijdr. vischf. Amboina, p. 4. — Atl. Ichth. I, 1862, p. 160.
Cossyphus bilunulatus Günther, Cat. Brit. Mus. IV, 1862, p. 105. — Fishes of Zanzibar, 1866, p. 87. — Fische der Südsee II, 1881, p. 240.
Cossyphus bilunulatus Day, Fishes of India. Suppl. 1888, p. 396.
Harpe bilunulata Steindachner, Denkschr. Akad. Wien LXX, 1900, p. 503.
Lepidaplois bilunulatus Seale & Bean, Proc. U. S. Nat. Mus. XXXIII, 1908, p. 245.
Lepidaplois bilunulatus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 328 (sine syn.).
Lepidaplois bilunulatus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 207 (sine syn.).
Lepidaplois bilunulatus Fowler, Acad. Nat. Sc. Philadelphia, Monogr. 2. 1938, p. 236.

D. XII. 10 (11). A. III. 12 (13). P. 2. 14. V. I. 5. Ll. 33—35. Ltr. $\begin{array}{c} 5\frac{1}{2} \\ \hline 1 \\ \hline 12-13 \end{array}$.

Height 2.8—2.9, 3.4—3.8 in length with caudal. Head 2.8—2.9, 3.4—3.7 in length with caudal. Height of head 1.2 in its length. Eye 4.8—6.4, 1.5—2 in snout and 1.2—1.8 in almost flat interorbital space. Mouth somewhat oblique, rather large, moderately protractile. Maxillary reaching to below frontborder of eye. Upper lip plated. Teeth conical, in a single row in the jaws, in adults the posterior teeth in the upper jaw are more pointed and the last one is a moderate canine. At the symphysis of both jaws the teeth are lower and rounded, almost molar-like, and in several series, forming a patch. At the innerside of this patch four canines in each jaw, the inner pair of the lower jaw much smaller than the others. Cheeks with about ten transverse rows of small scales, leaving a narrow posterior and inferior limb of the preopercle naked. Hindmargin of preopercle scarcely crenulated, almost smooth. Interopercle, subopercle and opercle densely covered with small scales, the posterior ones however larger. Scales on upper part of head beginning above hindborder of eye. About 14—16 rows of scales before dorsal, the 5 anterior rows consisting of much smaller and more elongate scales than the others. Dorsal spines rather strong, stiff, and pungent, the first equal to eye or somewhat longer, the following slightly increasing in length, the 12th spine about twice diameter of eye. Scaly sheath of dorsal much higher posteriorly than anteriorly. The membranes between the spines deeply incised. Soft dorsal rounded behind, about as high as posterior part of spinous part. First anal spine less than eye, third longest, about one eye-diameter and a half. The membranes between the spines deeply incised. Soft anal similar to soft dorsal. Pectorals equal to head without snout or half diameter of eye shorter in large specimens. Ventrals with the first and second rays produced, longer than pectorals. Caudal truncate, with the upper and lower rays produced. Colour of preserved specimens yellowish, or pinkish brown. A large oblong black blotch between base of soft dorsal and lateral line, extending also on anterior half of back of caudal peduncle; in young ones extending downwards to or on anal. A broad brown band from behind corner of mouth over lower parts of preopercle to hindmargin of subopercle and interopercle. Fins pinkish or yellowish. Membranes between the first and third or fourth spines deep black. Length 393 mm.

Habitat: Ambon; Misol. — Madagascar, Mauritius, Réunion, Ceylon, Philippines!, Pearl and Hermes reef?, Hawaii.

Note. Fowler has united *Cossyphus albolineatus* C. V. from Hawaii with this species. There is a difference in the markings on the head, as has been pointed out by other American authors but what is of more importance, is that Cuvier and Valenciennes say that the preopercle is covered with scales "sans limbe nu". This point has not been mentioned by other authors but if the figure, given by Jordan & Evermann Bull. U. S. Fish Comm. XXIII, 1905, p. 278, Pl. 24) is correct, the preopercle is scaled as described by the French authors.

5. **Bodianus oxycephalus** (Blkr.)

Cossyphus oxycephalus Bleeker, Versl. Akad. Amsterdam XIV, 1862, p. 129.
Cossyphus unimaculatus Günther, Cat. Brit. Mus. IV, 1862, p. 109, p. 506.

Cossyphys unimaculatus de Castelnau, Proc. Linn. Soc. New S. Wales III, 1879, p. 389.
Harpe oxycephalus Bleeker, Verh. Akad. Amsterdam XVIII, 1879, Enum. poissons Japon, p. 5.
Cossyphus unimaculatus Macleay, Descr. Cat. Austr. Fish. II, 1881, p. 77.
Cossyphus unimaculatus Johnston, Proc. Roy. Soc. Tasmania (1884) 1885, p. 255.
Cossyphus unimaculatus Steindachner & Döderlein, Denkschr. Akad. Wien LIII, 1887, p. 271.
Cossyphus unimaculatus Steindachner, Sitzber. Akad. Wien CIII, 1894, p. 445.
Verreo oxycephalus Jordan & Snyder, Proc. U. S. Nat. Mus. XXIV, 1902, p. 619.
Verreo oxycephalus Jordan & Evermann, Bull. U. S. Fish Comm. XXIII (1903) 1905, p. 281.
Verreo oxycephalus McCulloch, Austr. Zool. II. Prt. III, 1922, p. 99.
Verreo oxycephalus Jordan & Jordan, Mem. Carnegie Mus. X, 1922—1925, p. 69.
Lepidoplois oxycephalus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 329.
Verreo oxycephalus McCulloch, Mem. Austr. Mus. V, Checklist Fish. Austr. Prt. II. 1929, p. 323.

D. XII. 10—11. A. III. 11—12. P. 2. 14. V. I. 5. Ll. 33—35. Ltr. $\begin{array}{c}6\\ \hline 1\\ \hline 13\end{array}$.

Height 2.8—3, 3.3—3.4 in length with caudal. Head 2.9, 3.4 in length with caudal. Height of head about 1.2 in its length. Eye 4.6—7, a little less than interorbital space and 2—2.6 in pointed snout. Mouth slightly oblique. Maxillary almost reaching to below anterior border of eye. Teeth in two series in jaws, the outer ones canine-like, diminishing in size posteriorly, the inner ones coalesced into a narrow blunt-edged plate. Four canines anteriorly in each jaw, those of the upper jaw subequal, the outer pair in the lower jaw longer than the inner pair. A posterior canine in the upper jaw. Cheeks with about 7 transverse rows of scales, leaving a rather narrow inferior and posterior limb naked. Preopercle finely serrated posteriorly. Dorsal spines rather strong, increasing in height posteriorly, the last one 2.8 in head. Membranes between the spines deeply incised. Soft dorsal rounded behind, slightly higher than spinous part, the longest ray 2.2 in head. Anal spines strong, the second heaviest, the third longest, 2.6 in head. Soft anal similar to soft dorsal. Caudal slightly concave, the upper lobe slightly longer than the lower one. Pectorals 1.7 in head. Ventrals not quite reaching anus. Colour of preserved specimens very pale brown with more or less distinct longitudinal pale lines, running from hindborder of eye to caudal. Sometimes a few light blotches below dorsal, which generally has a black blotch between 7th to 9th spines. Length 623 mm (Compiled, not seen by me).

Habitat. Coasts of New Guinea. — Japan, coasts of Australia, Tasmania, New Zealand, Hawaii. In sea.

6. **Parabodianus** n.g.

Oblong, compressed. Head pointed. Body covered with moderate scales. Scales on opercle present, and smaller ones in several series on cheek. Hindborder of preopercle smooth. Lateral line not interrupted and without a sharp bent, running along the upper part of the body and the middle of the tail. Mouth protractile. Upper lip exposed when the mouth is closed. A band of villiform teeth in the upper jaw, continuous at symphysis. Laterally an outer series of larger pointed teeth. Anteriorly at symphysis four moderate canines, somewhat curved backwards. In the lower jaw a patch of villiform teeth at symphysis and laterally a row of caninoid teeth. The anterior rows of the patch of teeth at symphysis consist of larger teeth and are more or less caninoid. A large tusk-like horizontal canine, flaring outwards and somewhat curved backwards on both sides of this patch. No posterior canine. Dorsal consisting of X spines and 9 soft rays. Anal with III spines and 7 rays. Base of dorsal and anal without scales. Pectorals rounded. Ventrals pointed. Caudal forked.

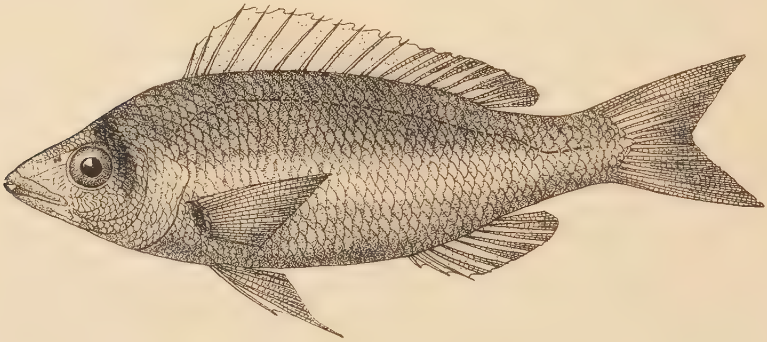

Fig. 10. *Parabodianus rutteni* de Bfrt. × 1/2.

Distribution: that of the single species known.

1. **Parabodianus rutteni** n. sp. (Fig. 10, p. 50)

D. X. 9. A. III. 7 (8). P. 2. 14. V. I. 5. Ll. 45. Ltr. $\begin{array}{c}2\frac{1}{2}\\\hline 1\\\hline 11\end{array}$.

Height 3, 3.7 in length with caudal. Head 3.4. 4.1 in length with caudal; its height 1.2 in its length. Eye 3.9, 1.4 in snout and 1.2 in somewhat convex interorbital space. About 8 transverse rows of scales on cheek. Inferior preopercular limb naked. Scales on upper part of head small, covering interorbital space but not reaching to posterior nostrils. Dorsal spines stiff and pungent, the fourth longest and equal to snout and half diameter of eye together. Soft dorsal rounded, not higher than spinous part. First anal spine less than half length of second. Third anal spine longest, less than snout but more than eye. Soft anal similar to soft dorsal. Ventrals with the first ray somewhat produced, half length of snout shorter than head. Pectorals somewhat shorter than ventrals. Caudal forked. Colour of preserved specimen reddish brown, back darker. Hind-borders of eyes connected by a dusky band over nape. An indication of a broad longitudinal band along sides. A dusky band along base of pectoral. Length of the single specimen 228 mm. Dr. L. Rutten leg.

Habitat: Borneo (Bontang!).

7. **Cymolutes** Günther

(Günther, Ann. Mag. Nat. Hist. (3) VIII, 1861, p. 387)

Elongate, much compressed. Body covered with small scales, about 80 in lateral line. Lateral line running along upper part of side, interrupted below posterior part of dorsal and continued on middle of caudal peduncle. Head naked, superiorly the scales begin about operculum, but a median dorsal area from occiput to origin of dorsal remains scaleless. Eye very high up, snout much curved. Mouth rather large, not protractile, lower jaw somewhat prominent.

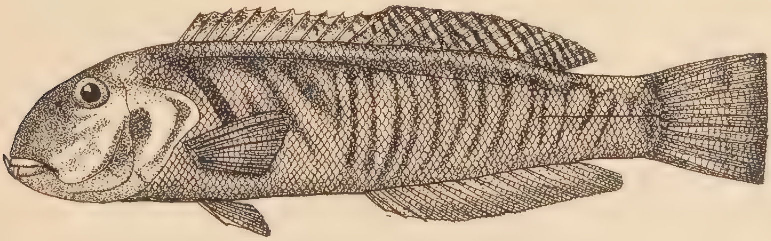

Fig. 11. *Cymolutes lecluse* (Q. G.). n. s.

Small pointed teeth in a row in the jaws. Anteriorly two large tusk-like canines in both jaws, projecting beyond the lips when the mouth is closed, those of the lower jaw fitting in between those of the upper jaw. No posterior canine. Dorsal consisting of IX spines and 12 rays; the first and second spines are flexible, the following stiff and pungent. Anal consisting of III spines and 12 rays, the first spine minute, the third longest. Pectorals somewhat rounded. Ventrals truncate, small. Caudal truncate or slightly rounded. Gillmembranes united to isthmus.

Distribution: that of the single species known.

1. **Cymolutes lecluse** (Q. G.) (Fig. 11, p. 51)

Xyrichthys lecluse Quoy & Gaimard, Voy. Uranie. Zool. 1824, p. 284.
Julis praetextata Quoy & Gaimard, Voy. Astrolobe. Zool. III, 1834, p. 712.
Xyrichthys microlepidotus Cuvier & Valenciennes, Hist. Nat. Poissons XIV, 1839, p. 52.
Xyrichthys torquatus Cuvier & Valenciennes, ibid. p. 54.
Xyrichthys novaculoïdes Bleeker, Nat, Tijdschr. Ned. Indië IV, 1853, p. 122.
Novacula xyrichthyoides Bleeker, ibid. X, 1856, p. 488.
Novacula praetextata Bleeker, ibid. XX, 1859—1860, p. 207.
Cymolutes praetextatus Günther, Ann. Mag. Nat. Hist. (3) VIII 1861, p. 387. — Cat. Brit. Mus. IV 1862, p. 207.
Cymolutes praetextatus Bleeker, Atl. Ichth. I 1862, p. 146.
Cymolutes praetextatus Günther, Fishes of Zanzibar, 1866, p. 102.
Cymolutes praetextatus Day, Fishes of India. Part. III, 1877, p. 409.
Cymolutes lecluse Jordan & Evermann, Bull. U. S. Fish Comm. XXIII. (1903) 1905, p. 327.
Cymolutes praetextatus Günther, Fische der Südsee III, 1909, p. 289.
Cymolutes leclusii Günther, l.c.
Cymolutes praetextatus Kendall & Goldborough, Mem. Mus. Comp. Zool. XXVI. no. 7, 1911, p. 304.
Cymolutes praetextatus Barnard, Ann. S. Afric. Mus. XXI, 1925—1927, p 771.
Cymolutes lecluse Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 364.
Cymolutes lecluse Fowler & Bean, Bull. U. S. Nat. Mus. 100, vol. VII, 1928, p. 368.
Cymolutes lecluse Herre, Notes Fishes Zool. Mus. Stanford Univ. I, 1931, p. 77.
Cymolutes praetextatus Herre, l.c.
Cymolutes lecluse Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 330.
Cymolutes lecluse Fowler, Acad. Nat. Sc. Philadelphia, monogr. 2, 1938, p. 241.

D. IX. 12. A. III. 12. P. 2. 10. V. I. 5. Ll. 55—60 + 17. Sq. l. 82. Ltr. $\frac{\overset{4}{1}}{21}$.

Height 4.3—4, 4.5—5.1 in length with caudal. Head 3.2, 3.7—3.8 in length with caudal. Height of head 1.3—1.4 in its length.

Eye situated near dorsal profile, 4.5—5.5, 2.6—3 in snout and about equal to interorbital space. Mouth horizontal. Maxillary reaching to below posterior nostril. Lips rather thick. First dorsal spine about equal to eye, last one somewhat longer. Membranes between the spines not incised. Soft dorsal not or scarcely higher than spinous part. First anal spine minute, third longest, equal to vertical diameter of eye. Soft anal similar to soft dorsal. Pectorals equal to head without snout. Ventrals equal to postorbital part of head. Caudal truncate or slightly rounded.

Colour of preserved specimens light brownish pink. A violet vertical band behind eye. Generally a dark band, two scales wide, from below anterior dorsal spines to behind axil of pectorals. A more or less distinct dark band along lateral line and upperpart of tail may be present, from which band narrow dark more or less vertical lines sometimes branch off on tail and caudal peduncle, reaching to anus and base of anal. Snout and upper part of head brownish violet, cheeks pink. Fins white, dorsal sometimes with gray reticulations. A dark blotch may be present below sixth dorsal spine. Length 185 mm.

Habitat: Pulu Weh!; Java; Bali; Borneo!; Celebes (Menado); Ternate; Buru; Ambon. — Coast of Natal, Zanzibar, Mauritius, Ceylon, Philippines, Pelew Islands, Fiji, Tonga Islands, Hawaii. In sea.

8. **Hemipteronotus** Lacepède

(Lacepède, Hist. Nat. Poissons III, 1802, p. 214)

Oblong, very much compressed, the dorsal profile of head with a sharp edge, much curved, sloping down almost vertically from before eyes to snout. Eye much nearer to dorsal profile than to corner of mouth. Body covered with large scales, those of belly smaller than the rest. Head naked, with exception of a smaller or larger patch of scales below the orbit and generally also on upper part of opercle. Jaws with a row of conical teeth, followed at the inner side with one or more rows of small, more or less granular teeth. Two curved canines anteriorly in each jaw. No posterior canines. Lips moderately thick. Lateral line running along upper half of sides, interrupted below posterior part of dorsal and continued on caudal peduncle. Dorsal beginning above or at a short distance behind eye, consisting of IX spines and 12 (13) rays. The first and second spines generally more or less flexible, sometimes remote from, but always connected by a membrane with the third. Anal consisting of III spines and 12 (13) rays. A lesser or greater number of the dorsal and anal rays simple, not forked. Pectorals triangular, the tip more or less pointed. Ventrals with I spine and 5 rays, the first of which is generally simple and produced. Caudal rounded. Gillmembranes united to isthmus.

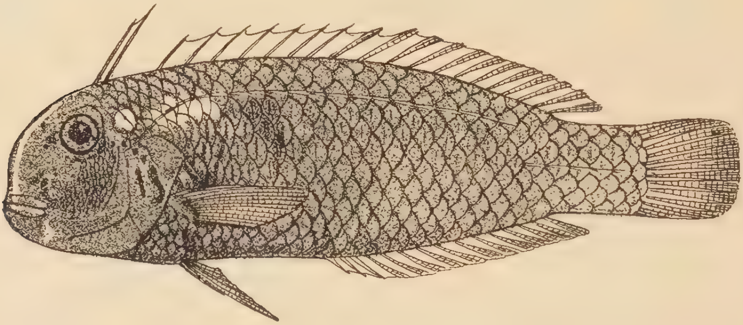

Fig. 12. *Hemipteronotus pentadactylus* (L.). n. s.

Distribution. Tropical and subtropical coasts of the Atlantic, Indic and Pacific, Mediterranean and Red Sea.

Note. The genera *Hemipteronotus, Iniistius, Novacula* and *Novaculichthys* have been united by several authors into one. They are certainly very near to each other and species are known which form transitions from one genus to the other. It is greatly for convenience sake that I have kept these genera apart, as the species known from our regions show the characteristics of each genus very plainly. *Hemipteronotus* Lac. is the oldest name, and has to be used in case one considers these genera as one.

Key to the Indo-australian species of Hemipteronotus

A. Scales on cheeks reaching from below eye downwards to behind corner of mouth.
  - *a*. A large creamy patch, red in life, on sides, extending from gillopening almost to origin of anal . . . . 1. *H. twisti* p. 55.
  - *b*. A light patch on the sides, a black blotch between two last dorsal rays . . . . 2. *H. stockumi* p. 56.
  - *c*. Generally a large dark blotch below Ll., and above tip of pectorals. Anterior scales of Ll. generally with a black spot, or a white spot with a black centre . . . . 3. *H. pentadactylus* p. 57.

d. Anal with a black spot between the posterior rays . . . . 4. *H. melanopus* ♂ p. 58.
e. A few dark spots on back, between Ll. and soft dorsal, preceded by a larger blotch on Ll. 4. *H. melanopus* ♀ p. 58.

B. Scales on cheeks by far not reaching down to behind corner of mouth.
a. A large dark patch above and partly below pectoral. Another oblong dark patch on caudal peduncle; both may be united by a dark band . . . . 5. *H. celebicus* p. 60.
b. Sides of body with indistinct dark transverse bands . . . . 6. *H. ancitensis* p. 62.

1. **Hemipteronotus twisti** (Blkr.)

Novacula Twistii Bleeker, Nat. Tijdschr. Ned. Indië X, 1856, p. 381.
Hemipteronotus Twistii Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 295. — Atl. Ichth. I 1862, p. 152.
Novacula twistii Günther, Cat. Brit. Mus. IV, 1862, p. 178.
Novacula twisti Steindachner, Abh. Senckenb. naturf. Ges. XXV, 1901, p. 443.
Hemipteronotus twistii Herre, Notes Fishes Zool. Mus. Stanf. Univ. 1931, p. 77.

D. IX. 12. A. III. 12. P. 2. 10. V. 1. 5. Ll. 20 + 6. Ltr. $\begin{array}{c}2\\\hline 1\\\hline 11\end{array}$.

Height 2.6, 2.9 in length with caudal. Head much compressed, dorsal profile trenchant, 3, 3.3 in length with caudal. Height of head, slightly more than its length. Eye 5.8, slightly less than the very convex and ridged interorbital space and 3.3 in snout. Mouth slightly oblique, lower jaw somewhat prominent. Small more or less granular teeth in several rows in the jaws, with an outer series of distant conical teeth and two large curved canines anteriorly in each jaw. Head naked, with exception of a few scales in a vertical row above opercle and about 6 rows of scales on preopercle, the superior one immediately behind eye and consisting of about 9 scales, the following shorter and the most inferior one, which is situated behind corner of mouth, with about 5 scales. There are also 3 rows of scales between eye and origin of dorsal, which begins above hinder half of eye. The two anterior dorsal spines flexible, longer than the others, with which they are connected by a low membrane, more than twice eye. Following spines stiff and pungent, subequal, about as long as eye. The 5 anterior rays of the dorsal are simple, the following are forked, the longest ray is more than twice eye. Dorsal pointed behind. First anal spine half as long as second, which is shorter than third. Third spine somewhat longer than eye. Soft anal similar to soft dorsal, the first ray simple, the following forked.

Pectorals pointed, concave posteriorly, as long as snout and half eye. Ventrals with the first ray simple and prolonged into a filament, equal to snout. Caudal rounded. Colour of preserved specimen reddish brown, scales along the back darker. A large creamy patch, red in life, on side, extending from gillopening almost to origin of anal and from one or two scales below lateral line to ventral profile. Fins hyaline. (Description made after a specimen of 194 mm length from Mindanas. Philippines).

Habitat: North Celebes; Sangi Islands; Ternate; Batjan; New Guinea. — Philippines!. In sea.

2. **Hemipteronotus stockumi** (Reuvens)

Novacula Stockumii Reuvens, Notes Leyden Mus. XVI, 1894, p. 131.
Hemipteronotus nigromaculatus Herre, Copeia 1933, no. 1, p. 20.

D. IX. 12. A. III. 12. P. 2. 10. V. I. 5. Ll. 20 + 5. Ltr. $\begin{array}{c} 1\frac{1}{2} \\ \hline 1 \\ \hline 10 \end{array}$.

Height 2.7, 3.2 in length with caudal. Head much compressed, upper profile trenchant and much curved, 2.8, 3.2, in length with caudal. Height of head nearly equal to its length. Eye 5.7, about equal to very convex and keeled interorbital space and 2.8 in snout. Mouth small, horizontal; maxillary scarcely reaching to below frontborder of eye. Teeth in the jaws pointed; two curved canines anteriorly in each jaw. Head naked, with exceptions of a few scales on superior part of opercle and about 7 transverse rows of scales on cheeks, the upper row consisting of about 7 scales, the following with less scales, the lowest row at level of corner of mouth. Origin of dorsal above hindmargin of preopercle. First and second spines of dorsal long and flexible, first twice as long as eye. These spines are connected with each other and with the following spines, which are stiff and pungent and somewhat less high than the flexible ones. Soft dorsal slightly higher than spinous part. First anal spine more than half as long as second, third spine longest, equal to eye. Pectorals slightly less than snout and eye together, ventrals almost equal to snout. Colour of preserved specimen reddish brown. A large creamy somewhat silvery patch on sides, extending from gill-opening to above anus, not reaching down to ventral profile or up to lateral line. Fins hyaline or yellowish. Soft dorsal with traces of dusky oblique bands and with a distinct black blotch between the 11th and 12th rays. Length 165 mm. (Description made after the type in the Leiden Museum).

Habitat: Paternoster Islands! — Philippines.

Note. Only two specimens are known of this species, which is perhaps only a colour-variety of *H. twisti.*

3. **Hemipteronotus pentadactylus** (L). (Fig. 12 p. 54)

Coryphaena pentadactyla Linné, Syst. Naturae Ed. 10, 1758, p. 261.
Coryphaena pentadactyla Bloch, Ausländ. Fische II, 1786, p. 140.
Coryphaena pentadactyla Bloch, Schneider. Syst. Ichthyol. 1801, p. 294.
Hemipteronotus quinque-maculatus Lacepède, Hist. Nat. Poissons III, 1802, p. 214.
Novacula pentadactyla Cuvier & Valenciennes, Hist. Nat. Poissons XIV, 1839, p. 69.
Novacula sexmaculata Cuvier & Valenciennes, ibid., p. 72.
Novaeula punctulata Cuvier & Valenciennes, ibid., p. 73.
Novacula pentadactyla Bleeker, Nat. Tijdschr. Ned. Indië II, 1851, p. 222.
Novacula punctulata Bleeker, ibid. V, 1853, p. 170.
Hemipteronotus pentadactylus, Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 294. — Atl. Ichth. I, 1862, p. 150.
Novacula pentadactyla Günther, Cat. Brit. Mus. IV, 1862, p. 177.
Novacula punctulata Günther, l.c. — Fishes of Zanzibar 1866, p. 97.
Novacula pentadactyla Klunzinger, Verh. zool. bot. Ges. Wien. XXI, 1871, p. 532.
Novacula pentadactyla Day, Fishes of India Part. III, 1877, p. 402.
Novacula punctulata Day, l.c.
Novacula pentadactyla Lunel, Mém. Soc. Phys. Hist. Nat. Genève 1881, p. 273.
Novacula (Hemipteronotus) pentadactyla Sauvage, Poissons de Madagascar 1891, p. 459.
?*Hemipteronotus pentadactylus* Jordan & Seale, Bull. Bur. Fish. XXVI, (1906), 1907, p. 31.
Hemipteronotus pentadactylum Barnard Ann. S. Afric. Mus. XXI, 1925—1927, p. 768.
Hemipteronotus pentadactylus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol VII. 1928, p. 370.
Hemipteronotus pentadactylus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 364.

D. IX. 12. A. III. 12 (13). P. 2. 10. V. I. 5. Ll. 20 + 5 or 20 + 6.

$$\text{Ltr. } \begin{array}{c} 1\frac{1}{2}-2 \\ \hline 1 \\ \hline 9-10 \end{array}.$$

Height 2.9—3.3, 3.4—4 in length with caudal. Head much compressed, upper profile trenchant and much curved, 3.4—3.7, 4.1—4.3 in length with caudal. Eye 4.8—6.6, somewhat more or less than very convex ridged interorbital space, 2.8—3.1 in snout. Mouth small, slightly oblique, maxillary reaching to below posterior nostril. Teeth in the jaws conical, the outer row larger, two strong canines anteriorly in both jaws. Head naked, with exception of some scales in a vertical row on upper part of opercle and about 8 rows on cheeks, the upper one immediately below eye and the lowermost behind corner of mouth, each row consisting of about 7—8 scales. There are also one or two rows of scales between eye and dorsal, the origin of which is situated above eye. First and second spines of dorsal flexible and produced, the second one generally the longer and often as long as snout, remote from but connected by a low membrane with the following ones, which are stiff and pungent, subequal, and about as long as eye. Soft dorsal higher than spinous part, the longest rays nearly twice eye, the fins pointed behind. Dorsal rays simple, only a few of the posterior rays forked. First anal spine about two thirds of second. Third spine longest, longer than eye. Soft anal similar to soft dorsal, rays simple excepting a few of the posterior ones. Pectorals rather pointed, their hindborder concave, as long as snout and eye together. Ventrals with the first ray simple and produced, almost as long as pectorals. Caudal rounded. Colour of preserved specimens brownish. Generally a large dark blotch below lateral line and above tip of pectoral, often followed below by a still larger light yellowish blotch. A various number (1—14) of the anterior scales of the lateral line generally with a black spot, sometimes broadly encircled by light yellow. Scales of body sometimes with a light, or a dark spot or a narrow light vertical streak. A narrow light line along the sharp ridge from snout to eye and some more or less distinct light vertical bars on anterior part of interopercle. Isthmus sometimes dark. Dorsal and anal with faint greyish bars, oblique on dorsal, longitudinal on anal. Caudal with similar vertical bars. Pectorals and ventrals hyaline. Length 248 mm.

Habitat: Singapore; Sumatra (Deli!); Nias!; Borneo!; Bali!; Celebes (Makassar, Bulukomba, Menado!, Tombariri); Ternate; Batjan; Halmahera; Buru, Ambon; Ceram!; New Guinea (Manokwari, Hood Bay). — Coast of Natal, Madagascar, Zanzibar, Red Sea, Mauritius, coast of British India, China, Formosa, Philippines, Hawaii. In sea.

4. **Hemipteronotus melanopus** (Blkr.)

Novacula melanopus Bleeker, Acta Soc. Sci. Indo-Neerl. II, 1857, achtste bijdr. vischf. Amboina, p. 82.
Novacula spilonotus Bleeker, ibid., p. 83.
Hemipteronotus spilonotus Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 295. — Atl. Ichth. I, 1862, p. 151.
Hemipteronotus melanopus Bleeker, ibid. p. 294. — ibid. p. 152.

Novacula melanopus Günther, Cat. Brit. Mus. IV, 1862, p. 178. — Fische der Südsee III, 1908, p. 286 (partim ?).

Novacula spilonotus Günther, l.c.

? *Hemipteronotus spilonotus* Fowler & Bean, Proc. U. S. Nat. Mus. LXII, 1922, p. 49.

? *Hemipteronotus melanopus* Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 365, ibid. XI, 1931, p. 359.

D. IX. 12 (13), A. III. 12 (13). P. 2. 10. V. I. 5. Ll. 20 + 6. Ltr. $\cfrac{\frac{1\frac{1}{2}}{1}}{11}$.

Height 3, 3.5 in length with caudal. Head much compressed, upper profile trenchant and much curved, 3, 3·5 in length with caudal. Eye 5.2, more than very convex and ridged interorbital space and 2,8 in snout. Mouth moderate, nearly horizontal, maxillary reaching almost to below frontborder of eye. Teeth in the jaws more or less molariform, small, in several rows, the outer row consisting of much larger conical teeth. Two strong curved canines anteriorly in each jaw. Head naked, with exception of a few scales in a horizontal row on upper part of opercle and about 9 transverse rows on cheeks, the upper one immediately below eye, the lowermost behind corner of mouth, each row consisting of 5—7 scales. There are also two rows of scales between eye and origin of dorsal, which is situated in vertical through hindborder of eye. Two anterior dorsal spines flexible and produced, twice as long as diameter of eye, remote from the third but connected by a low membrane. Third to last spines stiff and pungent, subequal and as long as eye. Soft dorsal higher than spinous part, the longest ray more than twice eye. Dorsal somewhat pointed behind. All rays simple, the two posterior ones only distinctly forked. Third anal spine longest, longer than eye. Soft anal similar to soft dorsal, all the rays forked, excepting the first. Pectorals rather pointed, their hindborder concave, equal to snout and eye together. Ventrals with the first ray simple and produced into a filament, equal to snout. Caudal rounded. Colour of preserved specimens pale yellowish or pinkish. A large creamy oblong patch, red in life, on sides, partly above and partly covered by the distal half of the pectoral. Fins hyaline. A black spot between the 10th and 11th, and the 12th and 13th anal rays. In females (*spilonotus*) this patch is wanting, and there are a few dark spots on back, between the lateral line and the soft dorsal, preceded by a larger spot on lateral line. Length 213 mm.

Habitat: Ambon!; Ceram; Buru!. — Philippines, Formosa? Hawaii?

Note. Günther and Fowler have united *Hemipteronotus baldwini* Jordan & Evermann (Bull. U. S. Fish Comm. XXII, (1902) 1904. p. 192 and XXIII (1903) 1905. p. 334) from Hawaii with this species. I am not quite sure that they are the same; as pointed out by the authors quoted above, the hawaiian specimens lack the red patch on the sides, but have a black blotch below last dorsal spines, which is missing in *melanopus*. Material of the latter is scarce in collections ,but Bleeker's 3 specimens, Günther's specimens from Ambon and my specimen in the Amsterdam Museum from the same locality agree in this respect. Possibly they represent two subspecies (geographical races) and therefore it seems safer to keep them apart. Jordan & Evermann had occasion to examine many specimens of *H. baldwini* and describe the female as lacking the blotch on the anal but having a row of black dots below dorsal and behind the black patch. These are exactly the markings which Bleeker describes as occurring in *H. spilonotus*. There is nothing, what prevents to suppose that *spilonotus* is the female of *melanopus*, the only difference being the number of forked rays in the dorsal, a character on which Bleeker laid too much stress. If my supposition is right, the females of *melanopus* and *baldwini* are more alike than the males, as they both have the black blotch below the dorsal, which is wanting in the male of *melanopus*, but the females still differ in the presence of a red patch on the sides, which also distinguishes the males of both species or subspecies.

The fish described by Fowler & Bean l.c. as *spilonotus* from Formosa may belong to another species. No mention is made of the characteristic black points along the back.

5. **Hemipteronotus celebicus** (Blkr.)

Novacula celebica Bleeker, Acta Soc. Sc. Indo-Neerl. I, 1856. Beschr. nieuwe vischs. Manado, p. 61.

Hemipteronotus celebicus Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 294. — Atl. Ichth. I, 1862, p. 153.

Novacula celebica Günther, Cat. Brit. Mus. IV, 1862, p. 178.

Hemipteronotus celebicus Fowler & Bean, Bull. U. S. Nat. Mus. 100, Vol. VII, 1928, p. 372.

D. IX. 12 (13). A. III. 12 (13). P. 2. 10. V. I. 5. Ll. 20 + 6. Ltr. $\frac{1\frac{1}{2}-2}{\frac{1}{10}}$.

Upper profile of body rounded, sloping down towards caudal, the caudal peduncle slender, 2.5—3 in height. Height 2.4—2.7, 2.8—3 in length with caudal. Head 2.9—3, 3.3—3.4 in length with caudal. Height of head 0.9—1 in its length. Eye 5.2—5.4, 2.7—2.9 in snout and about equal to very convex, ridged interorbital space. Mouth horizontal. Maxillary reaching to below nostrils or almost to below frontborder of eye. A series of conical, somewhat distant teeth in the jaws, and some very small teeth forming an incomplete inner row. Two curved canines anteriorly in each jaw. Head naked, excepting a few large scales in a horizontal series on upper part of opercle and three or four transverse rows of scales on cheeks, the upper one consisting of about 7 scales, immediately below eye, the following ones consisting of a few scales only, the lowermost far above horizontal through corner of mouth. There are also a few scales between eye and dorsal, the origin of which is situated behind eye, about in the vertical through hindborder of preopercle. First and second dorsal spines flexible, twice as long as eye, somewhat remote from, but connected by a low membrane with the following spines, which are stiff and pungent, subequal and as long as eye. Soft dorsal higher than spinous part, the longest rays about twice eye. All the rays simple, excepting the three or four posterior ones, which are forked. Dorsal somewhat pointed behind. First anal spine about half as long as second, third longest, somewhat more than eye. Soft anal similar to soft dorsal, the 4 anterior rays simple, the following forked. Pectorals with the tip rounded, the hindermargin almost straight, more than eye and snout together. Ventrals with the first ray simple and somewhat produced, as long as snout. Caudal rounded. Colour of preserved specimens reddish-brown. A large dark purple blotch above and partly underneath pectoral, connected through a purplish longitudinal stripe along middle of sides with another oval patch on caudal peduncle. A third, much smaller patch on the connecting stripe, above anterior part of anal, may be present. An indistinct light longitudinal band between lateral line and dorsal. Head sometimes with a greyish blue band from eye to posterior part of upper lip and another oblique one, above and behind eye, ending on upper part of opercle. Fins light reddish brown, the dorsal with darker oblique bars. Caudal with indications of vertical rows of darker spots. Distal part of membrane between first and second ventral rays sometimes dusky. Length 161 mm.

Habitat: Celebes (Makassar); Ambon. — Philippines!.

In sea.

6. **Hemipteronotus aneitensis** (Gthr.)

Novacula aneitensis Günther, Cat. Brit. Mus. IV, 1862, p. 176.
Xyrichthys niveilatus Jordan & Evermann, Bull. U. S. Fish Comm. XXII (1902) 1904, p. 194.
Hemipteronotus liogenys Fowler, Journ. Acad. Nat. Sc. Philadelphia (2) XII, Prt. 4, 1904, p. 539.
Xyrichthys niveilatus Jordan & Evermann, Bull. U. S. Fish Comm. XXIII (1903) 1905, p. 337.
Iniistius aneitensis Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 366.

D. IX. 12. A. III. 12. P. 2. 10. V. I. 5. Ll. 21—22 + 5—6.

Ltr. $\overset{1\frac{1}{2}}{\frac{1}{11}}$.

Height 2.7—3.1, 3.5 in length with caudal. Head 3.2—3.4, 3.8 in length with caudal. Height of head 0.9—1 in its length. Eye 4.5—5.7, about 2.5 in snout and equal to strongly convex, ridged interorbital space. Mouth slightly oblique. Maxillary not quite reaching to below nostrils. Teeth conical, two strong curved canines anteriorly in each jaw. Head naked, excepting a few scales on superior part of opercle and one or more transverse rows of scales on cheeks, by far not reaching to the level of the mouth. First and second dorsal spines flexible, not pungent, about twice eye, connected with the following spines, which are pungent, by a low membrane. Last dorsal ray about equal to first spine in length. Soft anal similar to soft dorsal. Pectorals equal to distance between tip of snout and hindmargin of eye. Ventrals with the first ray more or less produced, equal to snout. Caudal rounded. Colour of preserved specimens reddish, with traces of darker transverse bands, one from below anterior dorsal spines to pectoral, a second from below posterior spines and forming here a conspicuous dark patch, to anterior part of anal; a third from below posterior dorsal rays, forming here a more or less distinct dark patch, to posterior part of anal, and a fourth along base of caudal. The sides of the body between the first and second bands may be light. Dorsal and anal with or without dark oblique stripes. Length 269 mm.

Habitat: Sumatra (Padang). — Zanzibar, Philippines!, Solomon Islands, New Hebrides, Aneitum, Hawaii.

In sea.

9. **Iniistius** Gill

(Gill, Proc. Acad. Nat. Sc. Philadelphia 1862, p. 143)
Xyrichthys Bleeker, Atl. Ichth. I, 1862, p. 149 (nec C. V.).

Oblong, much compressed, the dorsal profile of the head with a sharp edge, much curved, sloping down almost vertically from before eyes to end of snout. Eye much nearer to dorsal profile than to corner of mouth. Body covered with large scales. Head naked or nearly so. Jaws with a row of conical teeth, followed in the upper jaw by one or more rows of smaller teeth. Two curved canines anteriorly in each jaw. No posterior canines. Lips moderately thick. Lateral line running along upper half of sides, interrupted below posterior part of dorsal and continued on caudal peduncle. The two anterior dorsal spines are long and flexible, rather far removed from the others and forming a separate fin, situated on the head, immediately behind the eye. The second dorsal consists of VII spines and 12—13 rays. Anal with III spines and 12—13 rays. Pectorals triangular. Ventrals pointed, with one spine and 5 rays. Caudal rounded.

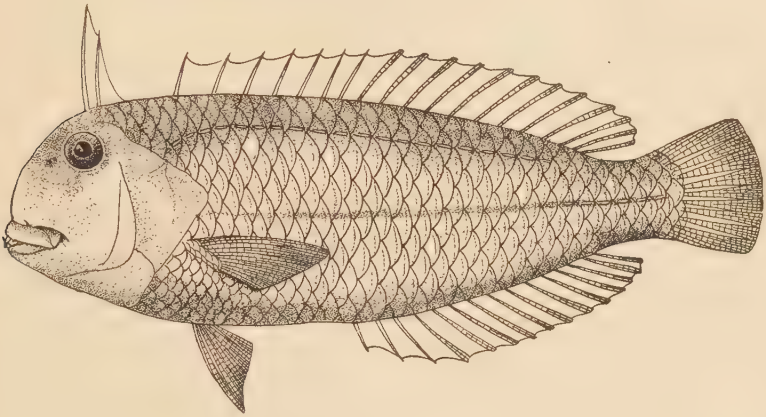

Fig. 13. *Iniistius pavo* (C. V.) × 1/2.

Distribution: Red Sea. Tropical and subtropical parts of Indic, and Pacific.

1. **Iniistius pavo** (C. V.). (Fig. 13 p. 63)

Xyrichthys pavo Cuvier & Valenciennes, Hist. Nat. Poissons XIV, 1839, p. 61.
Xyrichthys pavoninus Cuvier & Valenciennes, ibid., p. 63.
Novacula pavo Bleeker, Nat. Tijdschr. Ned. Indië X, 1856, p. 378.
Novacula tetrazona Bleeker, ibid. XVII, 1858—1859, p. 169.
Iniistius pavo Gill, Proc. Acad. Nat. Sc. Philadelphia 1862, p. 143.
Iniistius mundicorpus Gill, ibid., p. 145.
Xyrichthys tetrazona Bleeker, Atl. Ichth. I, 1862, p. 149.
Xyrichthys pavo Bleeker, l.c.
Novacula tetrazona Günther, Cat. Brit. Mus. IV, 1862, p. 175.

Novacula pavo Günther, l.c. — Fishes of Zanzibar, 1866, p. 97.
Novacula tetrazona Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 531.
Iniistius mundicorpus Jordan & Evermann, Fishes of North and Middle America II, 1898, p. 1620.
Novacula (Iniistius) pavo Steindachner, Denkschr. Akad. Wien LXX, 1900, p. 505.
Novacula (Iniistius) tetrazona Steindachner, l.c.
Iniistius leucozonus Jenkins, Bull. U. S. Fish Comm. XIX, 1901, p. 54.
Iniistius cacatua Waite, Rec. Austr. Mus. IV, 1901, p. 41.
Iniistius pavoninus Jenkins, Bull. U. S. Fish Comm. XXII (1902) 1904, p. 465.
Iniistius pavoninus Jordan & Evermann, ibid. XXIII, (1903) 1905, p. 329.
Novacula pavo Günther, Fische der Südsee III, 1909, p. 287.
Iniistius pavoninus McCulloch, Rec. Austr. Mus. XIV, No. 1, 1923, p. 17.
Iniistius tetrazona Barnard, Ann. S. Afric. Mus. XXI, 1925—1927, p. 770.
Iniistius pavo Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 365. Acad. Nat. Sc. Philadelphia, Monogr. 2, 1938, p. 80, p. 241.

D^1. 2. D^2. VII. 12 (13). A. III. 12 (13). P. 2. 10. V. I. 5.

Ll. 20—21+5—6. Ltr. $\begin{array}{c}1\frac{1}{2}\text{—}2\\ \hline 1\\ 10\text{—}11\end{array}$.

Height 2.2—2.8, 3.2—3.4 in length with caudal. Head 2.7—3.1, 3.4—3.7 in length with caudal. Height of head 1—1.1 in its length. Eye 5—6.9, 2.1—3.3 in snout and equal to or two thirds of very convex, keeled, interorbital space. Mouth small, slightly oblique. A row of pointed teeth in the jaws, some of them caninoid. Two curved canines anteriorly in each jaw. First dorsal much higher than second one, the first ray longer than the second and somewhat shorter or longer than head. Spines of second dorsal not much shorter than the rays, the membranes between them not incised. Third anal spine equal to or shorter than first spine of second dorsal. Soft anal similar to soft dorsal. Ventrals with the first ray produced, as long as pectorals and equal to snout and eye together. Caudal rounded. Colour of preserved specimens yellowish, with dark crossbands; the first beginning at base of first dorsal, which is also dark, running on sides of head through the eye. The second from base of 1st to 5th dorsal spines, the membranes of which are also dark, to middle of sides. The third from base of anterior dorsal rays to and on anterior part of anal, and the fourth from base of posterior dorsal rays to and on posterior part of anal. A large black, white-edged ocellus on the dorsal above the third and fourth band. The last band along base of caudal. A more or less distinct silvery patch on sides between the second and third bands. A black, white-edged ocellus may be present on the scale above the 7th or 8th scales of the lateral line. In old specimens there are no traces of the crossbands left, but the silvery patch on sides remains.

The dorsal has numerous, narrow, dusky oblique stripes and a submarginal dusky longitudinal band; the anal is uniform, with a median dusky longitudinal band. The scale above the 8th scale of the lateral line is black, with a more or less distinct white edge. Length 337 mm.

Habitat: Bali!; Sula Islands!; Ternate; New Guinea (Manokwari). — Coast of Natal, Zanzibar, Red Sea, Mauritius, Réunion, Cocos Islands, China, Philippines, Ponapé, Lord Howe Island, Mortlock, Tahiti, Marquesas Islands, Hawaii, Pacific coast of Mexico.

In sea.

10. **Xyrichthys** Cuvier

(Cuvier, Mém. Mus. Hist. Nat. Paris I, 1815, p. 317)

Novacula Cuvier, Règne Animal Ed. I. 1817. p. 265.

Oblong, very much compressed, the dorsal profile of the head with a sharp edge, much curved, steeply sloping downwards from before eye to tip of snout. Eye much nearer to dorsal profile than to corner of mouth. Body covered with large scales. Head naked, excepting a few scales below posterior border of eye. Jaws with several rows of conical teeth. Two canines anteriorly in each jaw. No posterior canines. Lips moderately thick. Lateral line interrupted below posterior part of dorsal, continued on middle of tail. Dorsal beginning above opercle, consisting of IX spines and 12—13 soft rays. The first and second spines flexible, the others pungent. The membranes between the spines not incised. Anal with III spines and 12—13 soft rays. Pectorals triangular. Ventrals pointed, with I spine and 5 rays. Caudal truncate or rounded.

Distribution: Atlantic. Two doubtful species from the Indic.

1. **Xyrichthys javanicus** (Blkr.)

Novacula javanica Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 305. — Atl. Ichth. I, 1862, p. 148.

D. IX. 12 (13). A. III. 12 (13). P. 2.10. V. 1.5. Ll. 28—29.

Height 3.1, 3.6 in length with caudal. Head 3.6. 4.1 in length with caudal. Eye 5.8. Anterior dorsal spines not produced; all spines subequal, as long as eye. Soft dorsal rays equal to postorbital part of head. Soft anal similar to soft dorsal. Pectorals equal to eye and postorbital part of head together. Ventrals as long as postorbital part of head. Caudal slightly rounded. Colour of preserved specimen reddish brown. A light patch between lateral line and tip of pectoral. Belly between pectorals and ventrals dark. Anal with oblique bands. Caudal with transverse bands. Length of single specimen 121 mm. (After Bleeker, not seen by me).

Habitat: Java?

Note. Bleeker described this species after a specimen labelled „Java" and belonging to the old collection of the Leiden Museum. It shows strong likeness to species from the Atlantic and probably the locality mentioned on the label is wrong. It has never been found again.

11. **Novaculichthys** Bleeker

(Bleeker, Proc. Zool. Soc. 1861, p. 414. — Versl. Akad. Amsterdam 1862, p. 102)

Body oblong, compressed. Head compressed, but the upper profile without sharp edge and sloping obliquely downwards from snout to eye. Body covered with large scales. Head naked, with exception of a few rows of scales on cheeks immediately below eye. Jaws with several rows of small granular teeth and an outer row of longer conical ones. Two canines anteriorly in each jaw. No posterior canines. Lips moderately thick. Lateral line interrupted below posterior part of soft dorsal and continued on middle of tail. Dorsal beginning above hindborder of preopercle, consisting of IX spines and 12—14 soft rays. The first and second spines flexible, the others pungent. Some of the spines may be filamentous (youth?). Anal with III spines and 12—14 soft rays. Pectorals

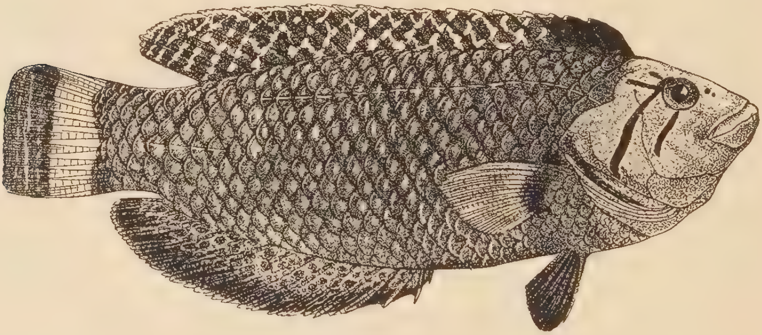

Fig. 14. *Novaculichthys taeniurus* (Lac.). × $^2/_3$.

rather short and broad, the hindborder more or less rounded. Ventrals rounded or pointed. Caudal rounded.

Distribution: Red Sea, tropical parts of Indic and Pacific.

Key to the Indo-australian species of Novaculichthys

1. Height 3.6—3.9. Two or more well defined oblique rows of scales behind and below eye. Pinkish brown, with dark blotches on posterior part of sides of tail. Caudal with one or two vertical rows of dark spots . . . . 1. *N. macrolepidotus* p. 67.
2. Height 2.8—3. Only a few rudimentary scales behind and below eye.
   - *a.* None of the dorsal spines filamentous. Colour brown, excepting head. Axil of pectoral and a crescentic row of scales underneath that fin black. Basal part of caudal light, distal part dark . . . . 2. *N. taeniurus* p. 69.
   - *b.* First and second and sometimes also fifth spines filamentous. Body with white blotches, bordered by dark lines . . . . 3. *N. bifer* p. 71.

1. **Novaculichthys macrolepidotus** (Bl.)

Labrus macrolepidotus Bloch, Naturgesch. Ausl. Fische V, 1791, p. 135.
Labrus arago Quoy & Gaimard, Voy. Uranie & Physicienne. Zool. 1824, p. 263.
Labrus taenionotus Quoy & Gaimard, ibid., p. 271.
Julis trimaculatus Cuvier & Valenciennes, Hist. Nat. Poissons XIII, 1839, p. 386.
Xyrichthys macrolepidotus Cuvier & Valenciennes, ibid. XIV, 1839, p. 59.
Novacula julioïdes Bleeker, Nat. Tijdschr. Ned. Indië II, 1851, p. 254.
Xyrichthys macrolepidotus Peters, Monatsber. Akad. Berlin 1855, p. 454.
Xyrichthys (Novacula) Arago Steindachner, Verh. zool. bot. Ges. Wien, 1861, p. 136.
Novaculichthys macrolepidotus Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 293. — Atl. Ichth. I, 1862, p. 144.
Novacula macrolepidota Günther, Cat. Brit. Mus. IV, 1862, p. 174. — Fishes of Zanzibar, 1866, p. 96.
Novacula macrolepidota Pfeffer, Jahrb. Hamb. wiss. Anst. VI, 1889, p. 22. — ibid. X, 1893, p. 19.
Novaculichthys macrolepidotus Evermann & Seale, Bull. Bur. Fish XXVI, (1906), p. 94.
Novacula macrolepidota M. Weber, Siboga Exp. Fische, 1913, p. 377.
Hemipteronotus macrolepidotum Barnard, Ann. S. Afr. Mus. XXI, 1925—1927, p. 769.
Novaculichthys macrolepidotus Fowler & Bean, Bull. U. S. Nat. Mus. VII, 1928, p. 365.

D. IX. 12 (13)—13 (14). A. III 13 (14). P. 2.9—10. V. I. 5. Ll. 20+6. Ltr. $\begin{array}{c}1\frac{1}{2}-2\\ \hline 1\\ \hline 9-10\end{array}$.

Height 3.6—3.9, 4.2—4.7 in length with caudal. Head compressed, but its dorsal profile not keeled, 3.5—3.6, 4.2—4.4 in length with caudal. Height of head 1.2—1.4 in its length. Eye 3—4, equal to or slightly more than convex interorbital space and 1.2—1.7 in snout. Mouth somewhat oblique; maxillary reaching to below posterior nostril. Jaws with several rows of small granular teeth and with an outer row of conical teeth, which are somewhat curved backward at tip and increase in length anteriorly, the two anterior ones in both jaws being canines. Head naked, excepting about 2 oblique rows behind and below eye and a row of somewhat larger scales in a horizontal row above opercle. Dorsal beginning slightly behind vertical through hindborder of preopercle, no scales before it. Two anterior dorsal spines flexible, following increasing in stiffness, the posterior ones stiff and pungent. Dorsal spines subequal, as long as eye. Soft dorsal much higher than spinous part, the longest rays equal to snout and eye together. The fin more or less truncate behind. First anal spine minute, third longest, almost as long as snout. Soft anal similar to soft dorsal. Pectorals rounded, a little longer than preorbital part of head. Ventrals with the first ray produced, as long as head without snout. Caudal rounded. Colour of preserved specimens pinkish brown, a row of dark, sometimes cloudy blotches on median line of posterior part of side of tail, sometimes continued to head, the spots here more or less fused into a band, with a silvery band immediately below it. Scales between dorsal and lateral line with oblique narrow dark stripes. An elongate dark spot in median line before ventrals, not always conspicuous. Head with grey bands, bordered by darker; one from eye to snout, continued backwards and upwards and tapering to a line, which almost reaches origin of dorsal.

Opercle ivory-coloured, crossed by a grey band, which reaches eyes and tapers towards both ends. Sometimes a dark stripe above it, from near eye to below origin of dorsal. Dorsal white or hyaline, with a black spot between the first and second spines and some dark markings on the soft portion of the fin. Similar markings sometimes on anal. Caudal with one or two vertical rows of dark spots. Paired fins hyaline. Length 141 mm.

Habitat: Java; Bali; Siau!; Celebes (Makassar!); Sangi Islands; Ambon; Ceram; Banda; Goram; Waigeu; New Guinea

(Hood Bay). — Natal (Delagoa Bay), Zanzibar, Mozambique, Riu Kiu Islands, Philippines. In sea.

2. **Novaculichthys taeniurus** (Lac.) (Fig. 14. p. 66)

Labrus taeniourus Lacepède, Hist. Nat. Poissons III, 1802, p. 488, p. 518.
Labrus hemisphaerium Lacepède, ibid. IV, 1802, p. 53, p. 160.
Julis vanikorensis Quoy & Gaimard, Voyage Astrolabe. Poissons, 1834, p. 704.
Xyrichthys taeniurus Cuvier & Valenciennes, Hist. Nat. Poissons XIV, 1839, p. 54.
Xyrichthys vanicolensis Cuvier & Valenciennes, ibid., p. 57.
Novacula cephalotaenia Bleeker, Nat. Tijdschr. Ned. Indië VI, 1854, p. 333.
Novacula taeniurus Bleeker, Acta Soc. Sc. Indo-Neerl. I, 1856. Beschr. nieuwe vischs. Menado en Makassar, p. 62.
Novaculichthys taeniurus Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 293. — Atl. Ichth. I, 1862, p. 144.
Novacula taeniurus Günther, Cat. Brit. Mus. IV, 1862, p. 172.
Novacula vanicolensis Günther, l.c.
Novacula taeniurus Günther, Fishes of Zanzibar, 1866, p. 96.
Novacula vanicolensis Steindachner, Denkschr. Akad. Wien LXX, 1900, p. 504.
Novaculichthys hemisphaerium Jenkins, Bull. U. S. Fish Comm. XXII, (1902) 1904, p. 464.
Novaculichthys taeniourus Jordan & Evermann, ibid. XXIII, (1903) 1905, p. 325.
Novaculichthys taeniurus Jordan & Seale, Bull. Bur. Fish. XXV (1905) 1906, p. 311.
Novaculichthys taeniurus Jordan & Richardson, ibid. XXVII, (1907) 1908, p. 267.
Novacula taeniurus Günther, Fische der Südsee III, 1909, p. 284.
Novacula taeniurus M. Weber, Siboga Exp. Fische, 1913, p. 376.
Novaculichthys taeniourus Fowler, Mem. B. P. Bishop Mus. 1928, p. 363.
Novacula taeniurus Duncker & Mohr, Mitt. Zool. Staatsinst. und Zool. Mus. Hamburg XLIV, ,1929, p. 68.
Novaculichthys taeniourus Fowler, Mem. B. P. Bishop Mus. XI, 1931, p. 359.
Novaculichthys taeniurus Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 330.
Novaculichthys taeniourus Fowler, Acad. Nat. Sc. Philadelphia. Monogr. 2, 1938, p. 240.

D. IX. 12 (13). A. III. 13 (14). P. 1. 11. V. I. 5. Ll. 20 + 5, or 19 + 6. Ltr. $\dfrac{2-2\frac{1}{2}}{\dfrac{1}{10}}$.

Height 2.8—2.9, 3.3—3.5 in length with caudal. Head compressed, but its dorsal profile not keeled, 2.9, 3.4—3.5 in length with caudal. Height of head 1.1—1.2 in its length. Eye 6.3—7, 1.3—1.5 in convex interorbital space and 2.2—2.5 in snout. Mouth oblique, maxillary reaching to below frontborder of eye. Jaws with several rows of small more or less granular teeth, and an outer row of large conical ones. Two strong curved canines anteriorly in each jaw. Head naked, excepting a few rudimentary scales along hindborder of eye, in a vertical row, and a few in a horizontal row above opercle. Dorsal beginning above hindmargin of preopercle, no scales before it. Anterior dorsal spines flexible, following increasing in stiffness. The first and second spines prolonged in the young, in adults the first is as long as snout or slightly shorter. Last spine slightly shorter than the first. Soft dorsal higher than spinous part. Anal spines stiff, flexible at their extremities. First anal spine short and slender, hidden in thick skin. Third spine longest, somewhat longer than snout. Soft anal deeper than soft dorsal, the longest ray as long as postorbital part of head. Both fins rounded behind. Pectorals broad and short, somewhat rounded behind, equal to, or somewhat less than postorbital part of head. Ventrals slightly shorter, inserted below pectorals. Caudal rounded. Colour of preserved specimens brown, the scales with a darker hindborder. In young specimens each scale with a white spot. A crescentic row of scales, covered by base of pectoral, black. Axil of pectoral also black. Head uniform in adults, in young and half-grown with dark stripes radiating from eye, sometimes bordered with a narrow white line; two or three running forwards over interorbital space and snout to the other eye, two others from hindborder of eye to temporal region, one to lower part of opercle, and one to posterior edge of preopercle. A large black blotch between first and second and second and third dorsal spines, rest of fin brown or greyish with oblique, parallel white bands, narrower than the interspaces and often anastomosing, specially in the posterior part of the fin. Anal with less distinct light bars, the fin darker distally, and with a very narrow light border. Basal part of caudal generally light yellow, distal part dark brown with vertical light bars, similar to those of the dorsal, but generally less distinct. Pectorals light brown, darker at base. Ventrals dark brown, the rays lighter. Length 272 mm. (Specimens of Bleeker's collection in the Amsterdam Museum examined.)

Habitat: Celebes (Makassar!, Menado, Tombariri); Sangi Islands; Sulu Islands!; Flores; Rotti!; Timor; New Guinea (Papua). — Madagascar, Zanzibar, Mauritius, Réunion, Riu Kiu Islands, Philippines!, Pelew Islands, Yap, Marshall Islands, St. Matthias, New Ireland, Santa Cruz Islands, New Hebrides, Fiji, Samoa, Society Islands, Hawaii!. In sea.

3. **Novaculichthys bifer** (Lay & Bennett)

Julis bifer Lay & Bennett, Beechey's voyage. Zool. 1839, p. 64.
Novacula Hoedti Bleeker, Acta Soc. Sc. Indo-Neerl. I, 1856. Beschr. nieuwe vischs. Amboina, p. 59.
Novacula kallosoma Bleeker, ibid. VIII, 1860. Elfde bijdr. vischf. Amboina, p. 5.
Novaculichthys kallosoma Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 293. — Atl. Ichth. I, 1862, p. 145.
Novacula hoedtii Günther, Cat. Brit. Mus. IV, 1862, p. 173.
Novacula kallosoma Günther, ibid., p. 176.
Novaculichthys kallosoma Snyder, Bull. U. S. Fish Comm. XXII, (1902) 1904, p. 530.
Novaculichthys kallosoma Jordan & Evermann, ibid XXIII, (1903) 1905, p. 327.
Novacula kallosoma Günther, Fische der Südsee III, 1909, p. 286.
Novaculichthys (Semachlorella) bifer Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII. 1928, p. 367.
Novaculichthys bifer Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 364.

D. IX. 12 (13). A. III. 12 (13). P. 2. 11. V. I. 5. Ll. 19 + 5. Ltr. $\begin{array}{c}2\\ \hline 1\\ \hline 10\end{array}$.

Height 3. Head 2.8—3. Eye 4.5—5, 1.2 in snout and equal to interorbital space. Maxillary reaching to below anterior part of eye. Teeth in two series in the jaws, the inner ones granular, the outer ones conical. Two moderate canines anteriorly in each jaw, those of the lower fitting between those of the upper jaw, when the mouth is closed. Some small scales above and behind eye. First and second dorsal spines flexible, greatly produced, the first equal to head. Following spines pungent, but the fifth may have a produced filament. Soft dorsal higher than spinous part, similar to soft anal. Anal spines slender, the third longest. Pectorals reaching to above origin of anal. Ventrals pointed, when depressed, reaching anal opening. Caudal rounded. Colour of preserved specimens pale brown, green in life. About 5 dusky brown lines radiate from eye. Rather large white spots, more or less distinctly bordered by dark, scattered on the body. Dorsal and anal with more or less distinct alternating light and dark bands. Caudal light, with a median and a marginal brown band. Pectorals whitish. Ventrals blackish. Length 114 mm.

Habitat: Bali; Celebes (Makassar); Sangi Islands; Ambon. — Philippines, Ponapé, Samoa, Tahiti, Hawaii.

In sea.

Note. Bleeker and Günther considered *Julis bifer* to be identical with *Novacula hoedti* Blkr. Bleeker moreover was of opinion, that it represents a variety of *N. taeniurus*. It is curious that neither Bleeker or Günther compared it with *N. kallosoma* Blkr., and as far as I can see the identity of *bifer* and *kallosoma* has only recently been pointed out by Fowler & Bean.

The filamentous prolongations of the dorsal spines and the small size suggest youth. I think it quite possible, that *bifer* is the young stage of *taeniurus*.

12. **Epibulus** Cuvier

(Cuvier, Mém. Mus. Hist. Nat. Paris I, 1815, p. 111. — Règne Animal Ed. I, 1817, p. 264)

Body oblong, compressed, covered with large scales, which form a well developed sheath on base of dorsal and anal. Base of caudal covered with three very large scales. Preopercle totally covered by two transverse rows of scales. Mouth oblique, moderate and extremely protractile. The lower jaw much produced backwards, reaching far behind eye, when the mouth is closed ¹). A single series of teeth in the jaws. Two distant canines in the anterior part of each jaw, those of the upper jaw directed forwards, those of the lower jaw obliquely upwards. Dorsal consisting of IX spines and 10—11 rays.

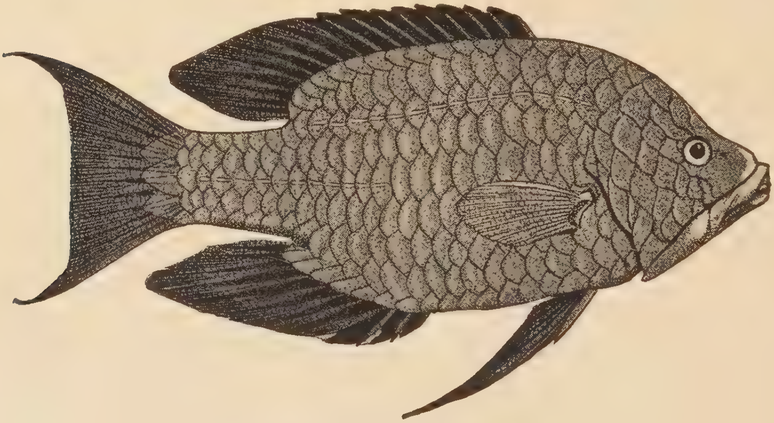

Fig. 15. *Epibulus insidiator* (Pallas). × $^2/_5$.

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1) For the mechanism of the movements in opening and closing the mouth see Van Dobben. Arch. Néerl. Zool. II, 1935, p. 61.

Anal with III spines and 8—9 rays. Pectorals rounded. Caudal truncate, the upper and lower rays much produced.

Distribution: that of the single species known.

1. **Epibulus insidiator** (Pallas)

Sparus insidiator Pallas, Spicil. Zool. VIII, 1770, p. 41.
Sparus insidiator Bloch Schneider, Syst. Ichth. 1801, p. 278.
Sparus insidiator Lacepède, Hist. Nat. Poissons IV, 1802, p. 120.
Epibulus insidiator Cuvier, Mém. Mus. Hist. Nat. Paris I, 1815, p. 111. — Règne Anim. Ed. I. 1817, p. 264.
Epibulus insidiator Cuvier & Valenciennes, Hist. Nat. Poissons XIV, 1839, p. 110.
Epibulus insidiator Bleeker, Verh. Bat. Gen. XXII (1847), 1849. Gladsch. Labr. p. 40. — Atl. Ichth. I, 1862, p. 74.
Epibulus insidiator Günther, Cat. Brit. Mus. IV, 1862, p. 135.
Epibulus insidiator Kner, Novara Exp. Fische I, 1865—1867, p. 252.
Epibulus insidiator Günther, Fishes of Zanzibar, 1866, p. 91.
Epibulus insidiator Day, Proc. Zool. Soc. 1870, p. 697. — Fishes of India, Part III, 1877, p. 395.
Epibulus insidiator Günther, Fische der Südsee II, 1881, p. 250.
Epibulus insidiator Jordan & Seale, Bull. Bur. Fish. XXV, (1905), 1906, p. 294.
Epibulus insidiator Snyder, Proc. U. S. Nat. Mus. XLII, 1912, p. 506.
Epibulus insidiator Fowler & Bean, ibid. LXII, 1922, p. 51. — Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 213.
Epibulus insidiator Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 330. — Occas. Papers B. P. Bishop Mus. IX, No. 18, 1932, p. 13.
Epibulus insidiator P. J. Schmidt, Bull. Acad. Sc. URSS, 1930, p. 550.
Epibulus insidiator Herre, Field Mus. Zool. Ser. XXI, 1936, p. 304.
Epibulus insidiator Fowler, Acad. Nat. Sc. Philadelphia, Monogr. 2, 1938, p. 109, p. 148, p. 175.

D. IX. 10—11. A. III. 8—9. P. 2. 10. V. I. 5. Ll. 14 + 8 or 16 + 11. Ltr. $\begin{array}{c}1\frac{1}{2}\\ \hline 1\\ \hline 6\end{array}$.

Height 2—2.2, 2.8—3 in length with caudal. Head 2.5—2.9, 3.4—4 in length with caudal. Eye 6, 2—2.1 in snout and 1.4 in interorbital space. Mouth oblique, moderate and extremely protractile. Teeth conical, rather large, in one more or less regular series in both jaws. Two distant canines in frontpart of each jaw, those of the upper jaw directed forwards, those of the lower jaw obliquely upwards. Preopercle totally covered by two transverse rows of scales, the lower of which consists of a few very large scales. Profile of head very much curved behind eye. Scales beginning above eye. Eight scales before dorsal. Dorsal spines short and thick, subequal in length and somewhat longer than eye. Their membranes thick, not incised. Soft dorsal rays increasing in length to about the 6th or 7th, which are equal to postorbital part of head. Posterior rays shorter, the fin therefore pointed. Anal spines short but stout, the first shortest, the third longest and equal to twice diameter of eye. Soft anal rays rapidly increasing in length to the 5th or 6th, which is almost as long as head; posterior rays rapidly decreasing in length again, the fin therefore much pointed. Pectorals somewhat rounded, as long as head without snout or somewhat shorter. Ventrals with the second ray produced, much pointed, shorter or longer than head. Caudal truncate, but the outer rays much produced and curved. Colour of preserved specimens brownish, the fins lighter or darker. In life either light yellowish or lighter or dark brown. Spinous dorsal often with a dark blotch behind first ray and with two longitudinal dark brown bands. In young specimens body often with narrow milky white vertical bands. Length 335 mm.

Nomen indig.: Kakatua Sumpit, Tagih utang (Malay).

Habitat: Singapore; Sumatra (Padang); Nias; Java (Batavia!); Duizend Islands; Celebes (Makassar); Saleyer!; Lesser Sunda Islands!; Gomomo Island; Doworra Island; Talisse Island; Halmahera; Batjan; Ambon; Banda!; South New Guinea. — Zanzibar, Mauritius, Seychelles, Siam, Andamans, Riu Kiu Islands, Philippines, New Hebrides, Solomon Islands, coast of Queensland, Samoa, Rotuma, Society Islands, Paumotu Islands. In sea.

13. **Cheilinus** Lacepède

(Lacepède, Hist. Nat. Poissons III, 1802, p. 529)

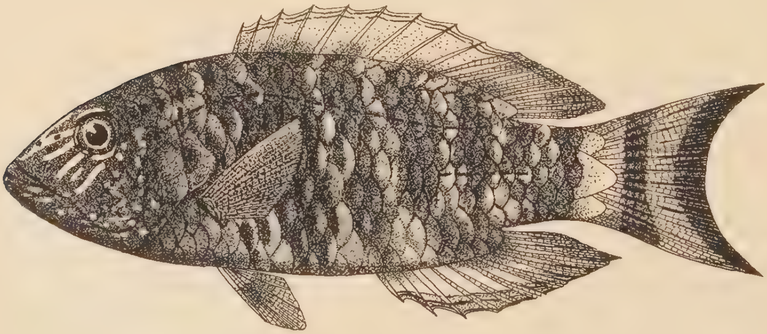

Fig. 16. *Cheilinus fasciatus* (Bl.). × $^1/_2$.

Body oblong or elongate, compressed, covered with large scales, which form a more or less developed sheath on base of dorsal and anal. Base of caudal covered by three very large scales, the median one longest. Lateral line interrupted. Head scaly, with exception of the snout. Preopercle smooth, with two transverse rows of scales. Mouth moderate. Lips thick, plated. A single row of conical teeth in both jaws, with two canines in frontpart of upper and lower jaw. Dorsal consisting of IX—X spines and 9—11 soft rays. Anal with III spines, the third of which is longest, and of 8—9 soft rays. Pectorals rounded. Ventrals pointed. Caudal rounded, the outer rays, and sometimes also the median rays, may be produced.

Distribution: Tropical and subtropical parts of Indic and Pacific, living mostly near coral-reefs. Some species grow to a large size.

Key to the Indo-australian species of Cheilinus

I. Dorsal with 10 spines. Height 2.2—2.6. Height of head 1—1.1 in its length . . . . 1. *Ch. chlorurus* p. 76.
II. Dorsal with 9 spines.
  A. Height 2.2—2.6. Height of head 1.—1.1 in its length.
    a. Inferior limb of preopercle scaly. Body generally with 4 dark spots along middle of sides. Scaly sheath of D. and A. well developed . . . . 2. *Ch. oxycephalus* p. 78.
    b. Inferior limb of preopercle naked.
      1. Head with white (red in life) stripes and points. More or less distinct cross-bars on body. Four dark spots along middle of sides. Scaly sheath of D. and A. well developed . . . . 3. *Ch. trilobatus* p. 79.
      2. Seven distinct light transverse bands on body and tail. Scaly sheath of D. and A. well developed. Growing to a very large size . . . . 4. *Ch. fasciatus* p. 81.
      3. Scales of anterior lower half of body with white lines and figures. Two parallel distinct black lines from hind-border of eye running obliquely upwards. Scaly sheath of D. and A. low. Growing to a very large size . . . . 5. *Ch. undulatus* p. 83.
  B. Height 2.7—3.2. Height of head 1.1—1.2 in its length. Inferior naked limb of preopercle very narrow. Scaly sheath of D. and A. well developed. A darkbrown blotch immediately behind eye and a larger one below lateral line and just behind P . . . . 6. *Ch. bimaculatus* p. 84.
  C. Height 2.8—3.8. Height of head 1.3—1.8 in its length. Scaly sheath of D. and A. low or

very low. Inferior limb of preopercle naked.

- *a.* Height 3.8. A brown patch in lateral line below origin of D. . . . . 7. *Ch. mentalis* p. 86.
- *b.* Height 2.8—3.3. About 8 narrow black lines, running obliquely downwards and backwards on lower side of head . . . . 8. *Ch. diagramma* p. 88.
- *c.* Height 2.8—3.1. A light transverse band on caudal peduncle. C. white, outer rays brown . . . . 9. *Ch. rhodochrous* p. 90.
- *d.* Height 2.8—3.5. Body, specially anteriorly, freckled with light spots. A more or less distinct series of dark blotches, forming a cloudy irregular and interrupted band along sides. C. white, spreckled or striped with brown.
  1. Membranes between dorsal spines deeply incised. A dark spot between first and second dorsal spines. . . . 10. *Ch. oxyrhynchus* p. 91.
  2. Membranes between dorsal spines slightly incised. A dark spot between first and second and between second and third dorsal spines . . . . . . 11. *Ch. arenatus* p. 93.
  3. Membranes between dorsal spines not incised. A dark spot between first and second spines . . . . 12. *Ch. celebicus* p. 94.

1. **Cheilinus chlorurus** (Bl.)

Sparus chlorurus Bloch, Ausländ. Fische V, 1791, p. 24.
Cheilinus punctatus Bennett, Proc. Comm. Zool. Soc. I, 1830—1831, p. 167.
Cheilinus quinquecinctus Rüppell, Neue Wirbelthiere. Fische 1835, p. 19.
Cheilinus punctulatus Cuvier & Valenciennes, Hist. Nat. Poissons XIV, 1839, p. 87.
Cheilinus quinquecinctus Bleeker, Nat. Geneesk. Arch. Ned. Indië II (3), 1845, p. 513.
Cheilinus guttatus Bleeker. ibid. IV (2), 1847, p. 161. Verh. Bat. Gen. XXII, 1849. Gladsch. Labr. p. 36.
Cheilinus decacanthus Bleeker, Nat. Tijdschr. Ned. Indië II, 1851, p. 256.
Cheilinus chlorurus Bleeker, Atl. Ichth. I, 1862, p. 65.
Cheilinus punctatus Günther, Cat. Brit. Mus. IV, 1862, p. 127.
Cheilinus chlorurus Günther, ibid p. 128.
Cheilinus chlorurus Kner, Novara Exp. Fische I, 1865—1867, p. 251.
Cheilinus chlorurus Day, Fishes of India. Prt. III, 1877, p. 393.
Chilinus chlorurus Günther, Fische der Südsee II, 1881, p. 245.
Chilinus chlorurus Macleay, Descr. Cat. Austr. Fish II, 1881, p. 91.
Chilinus chlorurus Steindachner, Abh. Senckenb. Naturf. Ges. XXV, 1901, p. 441.
Thalliurus chlorurus Seale, Occas. Papers B. P. Bishop Mus. IV, 1906, p. 58.
Thalliurus chlorurus Jordan & Seale, Bull. Bur. Fish. XXV, (1905) 1906, p. 310.
Thalliurus chlorurus Snyder, Proc. U. S. Nat. Mus. XLII, 1912, p. 509.

Chilinus chlorurus Barnard, Ann. S. Africa Mus. 1925—1927, p. 766.
Cheilinus chlorurus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 362.
Cheilinus chlorurus Fowler. Mem. B. P. Bishop Mus. X, 1928, p. 362.
Cheilinus chlorourus Herre, Field Mus. Zool. Ser. XXI, 1936, p. 326.
Cheilinus chlorourus Fowler, Acad. Nat. Sc. Philadelphia. Monogr. 2, 1938, p. 130, p. 149.

D. X. 9—10. A. III. 8—9 (10). P. 2. 10. V. I. 5. Ll. 21—23. Ltr. $\begin{array}{c}2\\ \hline 1\\ \hline 6-7\end{array}$.

Height 2.2—2.6, 2.8—3.3 in length with caudal. Head 2.5—3, 3.2—3.8 in length with caudal. Height of head 1.—1.1 in its length. Eye 4.8—7.1, 1.7—2.5 in snout and 1.3—1.6 in convex interorbital space. Chin slightly prominent. Lips thick, plated. Mouth oblique. Maxillary not reaching to below eye. Conical teeth in a single row in both jaws, with two canines anteriorly in each jaw. Teeth green. Praeoperculum with 2 transverse rows of scales, smooth, its lower limb naked. Scales on upperpart of head beginning above middle of eye. Six rows of scales before dorsal. Dorsal spines strong but short, slightly increasing in length posteriorly, the membranes between the spines deeply incised, forming free rounded lobes behind each spine. In old specimens however the membrane is scarcely incised. Soft dorsal much higher than spinous part, the 6th and 7th rays longest, much so in adult specimens, where this fin is pointed. Origin of anal below 8th or 9th dorsal spines. First anal spine shortest, third longest and equal to snout or to snout and eye. Soft anal similar to soft dorsal, rounded in young, much pointed in adults. Scaly sheath of dorsal and anal well developed. Pectorals rounded, equal to postorbital part of head. Ventrals with the first ray produced in adults, half diameter of snout shorter than head, rounded and much shorter in young. Caudal rounded, in adults the upper and lower rays are much produced and the fin is trilobate. Colour of preserved specimens brown, distal part of caudal peduncle and sometimes also a saddle just behind dorsal much lighter. Head with numerous spots (red in life), forming lines and anastomosing figures on snout and often also round eye and on occiput. Sometimes the spots extend also on the body. Spinous dorsal brown, with a narrow dark upper border, followed by a broader white band and a second, narrower one at some distance below it. Soft dorsal dark anteriorly, white or yellowish posteriorly. Spinous part of anal coloured as spinous dorsal. Soft anal dark brown, freckled with white. Caudal dark at base, lighter distally, with numerous white spots, which are encircled by dark, forming rows of small ocelli distally. All spines and rays of vertical fins greenish. Ventrals dark, spotted with white, the rays greenish. Pectorals light yellowish. In young specimens the body is crossed by 4 broad cloudy darkbrown bars, the first from origin of dorsal through base of pectorals, the second below median part of spinous dorsal, the third through anterior part of soft dorsal to middle of anal, the fourth on caudal peduncle. Sometimes these bands are represented by dark spots on sides only, which may remain in older specimens. Length 260 mm.

Nomen indig.: Nuri-nuri (Malay Batavia).

Habitat: Pulu Weh!; Singapore; Batu Islands; Nias; Banka; Biliton; Java (Batavia, Bantam, Patjitan); Duizend Islands; Bawean; Borneo (Sandakan); Celebes (Makassar!, Bulukomba, Tombariri); Sangi Islands; Sulu Islands!; Karkaralong Islands!; Ternate; Halmahera; Buru; Ceram; Ambon; Nusa Laut!; Goram; Banda!; Samau!; Timor; Aru Islands; Waigeu!; New Guinea (Atjatuning!). — From Mozambique, Madagascar, Zanzibar, Mauritius, Seychelles, coast of British India, Andamans, Siam, Annam, Riu-Kiu Islands, Philippines, Pelew Islands, coast of Queensland, Pacific Islands eastwards to Paumotu Islands. In sea.

2. **Cheilinus oxycephalus** Blkr.

Cheilinus oxycephalus Bleeker, Nat. Tijdschr. Ned. Indië V, 1853, p. 349. — Atl. Ichth. I, 1862, p. 65.

Cheilinus oxycephalus Günther, Cat. Brit. Mus. IV, 1862, p. 128.

Chilinus oxycephalus M. Weber, Jenaische Denkschr. VIII, 1895, p. 111.

? *Cheilinus oxycephalus* Jordan & Richardson, Bull. Bur. Fish. XXVII, (1907) 1908, p. 267.

Cheilinus oxycephalus M. Weber, Siboga Exp. Fische 1913, p. 364.

Cheilinus oxycephalus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 346.

Cheilinus oxycephalus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 359.

D. IX. 10 (11). A. III. 8. P. 2. 10. V. I. 5. Ll. 21—24. (16 + 8). Ltr. $\begin{array}{c}2\\\hline 1\\\hline 6-7\end{array}$.

Height 2.3—2.6, 2.8—3.2 in length with caudal. Head 2.6—2.7, 3.2—3.3 in length with caudal. Height of head equal to its length. Eye 5—5.5, 1.2—1.4 in somewhat convex interorbital space and 1.6—1.8 in snout, the profile of which is concave. Mouth small, very oblique. Maxillary ending far before eyes. A single row of conical teeth in the jaws, with two canines anteriorly in each jaw. Teeth white. Preopercle smooth, with two transverse rows of scales, leaving only the posterior edge naked. Scales on upper part of head beginning above middle of eyes. Six rows of scales before dorsal. Dorsal spines gently increasing in length posteriorly, the last about equal to postorbital part of head, not shorter than anterior rays. The membranes between the spines incised and lobate in young. Soft dorsal rounded. Origin of anal below 8th or 9th dorsal spines. First anal spine shortest, third longest, equal to snout or somewhat longer. Soft anal rounded. Dorsal and anal with a well developed scaly sheath at base. Pectorals rounded, equal to snout and eye, as long as ventrals in young; in adults the ventrals are much pointed and one eye diameter longer than pectorals. Caudal rounded. Colour of preserved specimens brownish, sometimes with green reflections on operculum, and along base of dorsal and anal. In a large specimen the head is dotted with white, with exception of the snout. A row of four brown spots in median line of sides; the first behind head, the second behind pectorals, the third between end of dorsal and anal, and the fourth at base of caudal. These spots are not always distinct. A dark brown patch between first and second dorsal spines. Spinous dorsal with a narrow brown submarginal longitudinal band and traces of a second band below it. Anal with a reddish brown broad longitudinal band, getting obsolete posteriorly. Pectorals hyaline. Ventrals brownish. Caudal with a few brown transverse bands posteriorly. All spines and rays, excepting those of pectorals, green. Length 163 mm.

Habitat: Batu Islands: Saleyer!; Sadaa Island; Talaut Islands; Batjan; Gomomo Island; Maitara; Halmahera; Tidore; Flores; Ambon!; Banda!; South New Guinea. — Philippines, Society Islands. In sea.

3. **Cheilinus trilobatus** Lac.

Cheilinus trilobatus Lacepède, Hist. Nat. Poissons III, 1802, p. 529, p. 537.
Cheilinus trilobatus Cuvier & Valenciennes, Hist. Nat. Poissons XIV, 1839, p. 79.
Cheilinus rivulatus Cuvier & Valenciennes, ibid. p. 86.
Cheilinus trilobatus Bleeker, Verh. Bat. Gen. XXII, 1849. Gladsch. Labr. p. 34.
Cheilinus tetrazona Bleeker, Nat. Tijdschr. Ned. Indië IV. 1853, p. 293.
Cheilinus trilobatus Bleeker, Atl. Ichth. I, 1862, p. 66.
Cheilinus trilobatus Günther, Cat. Brit. Mus. IV, 1862, p. 126. — Fishes of Zanzibar, 1866, p. 88.
Chilinus trilobatus Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 553.
Chilinus trilobatus Günther, Fische der Südsee II, 1881, p. 244.
Chilinus trilobatus Kossmann & Räuber, Verh. Naturh. Med. Ver. Heidelberg I, 1876, p. 37.

Chilinus trilobatus Day, Fishes of India, Prt. III, 1877. p. 394.
Cheilinus trilobatus Jordan & Evermann, Bull. U. S. Fish Comm. XXIII, (1903) 1905, p. 322.
Cheilinus trilobatus Jordan & Seale, ibid. XXV, (1905) 1906, p. 308, ibid. XXVI, (1906) 1907, p. 31.
Cheilinus trilobatus Fowler & Bean, Proc. U. S. Nat. Mus. LXII, 1922, p. 51.
Cheilinus trilobatus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 360.
Cheilinus trilobatus P. Schmidt, Bull. Acad. Sci. U.R.S.S. I, 1930, p. 551.
Cheilinus trilobatus Fowler, Occ. Papers B. P. Bishop Mus. IX, 1932, p. 13.
Cheilinus trilobatus Herre, Field Mus. Zool. Ser. XXI, 1936, p. 329.
Cheilinus trilobatus Fowler, Acad. Nat. Sc. Philadelphia, Monogr. 2, 1938, p. 149.

D. IX. 10—11. A. III. 8—9. P. 2.10. V. I. 5. Ll. 20—22. Ltr. $\dfrac{2}{\dfrac{1}{6 \quad 7}}$.

Height 2.3—2.6, 2.8—3.4 in length with caudal. Head 2.6—2.9, 3.2—3.6 in length with caudal. Eye 4.6—6.1, 1.3—2 in snout and 1—1.5 in slightly convex interorbital space. Jaws equal. Chin slightly prominent. Lips thick. Mouth oblique. Maxillary not reaching to below frontborder of eye. Conical teeth in a single row in the jaws, with two canines anteriorly in each jaw. Teeth white. Preopercle smooth, with two transverse rows of scales, the lower limb and a narrow part of the posterior limb naked. Scales on head beginning above middle of eyes. Six or seven rows of scales before dorsal. Dorsal spines short but strong, slightly increasing in size posteriorly, the membranes between the spines deeply incised, more so in young specimens. In old specimens the membranes are not incised. Soft dorsal higher than spinous part, rounded in young, pointed in adults. Origin of anal below 8th dorsal spine. First anal spine shortest, third longest, about equal to last dorsal spine. Soft anal similar to soft dorsal. Scaly sheath of dorsal and anal well developed. Pectorals rounded, equal to postorbital part of head or somewhat longer. Ventrals with the first ray produced in adults, half diameter of snout shorter than head. Caudal rounded in young, in specimens above 200 mm the fin is pointed and the marginal rays much produced. Colour of preserved specimens brownish, with more or less distinct irregular dark brown crossbars, the first through origin of dorsal, the second through median dorsal spines, the third through last dorsal spines and anterior part of soft dorsal, the fourth through caudal peduncle. Four distant scales in the horizontal connecting tip of snout and middle caudal rays very dark brown, forming a row of four dark spots. Head with white stripes (red in life) from eye to snout; a similar stripe connecting eyes, followed by irregular white figures on occiput. Sides of head with white points and short stripes. Scales of body and tail in large specimens with narrow vertical white stripes. Dorsal and anal more or less variegated with brown, posterior part of dorsal white, with a dark brown basal blotch. Caudal brownish, with a light hindborder. All spines and rays, excepting those of pectorals, green. Pectorals hyaline. Ventrals with a more or less distinct transverse dark band. Length 398 mm.

Nom. indig.: Kakatua, Nuri-nuri (Malay Batavia). Maming (Menado).

Habitat: Singapore; Sumatra (Priaman, Ulakan, Padang, Benkulen, Kauer); Nias!; Java (Batavia!, Anjer); Duizend Islands!; Bawean; Bali; Celebes (Menado, Badjoa); Talaut Islands!; Ternate; Halmahera; Buru; Ceram; Ambon!; Saparua; Timor; Rotti!; South New Guinea. — Madagascar, Zanzibar, Réunion, Seychelles, Red Sea, Aden, Andamans, Indo China, China, Riu Kiu Islands, Philippines, Pacific Islands eastwards to Hawaii and Society Islands. In sea.

Note. This species is very close to *Ch. chlorurus,* differing chiefly by having one dorsal spine less. The naked preopercular limb is as a rule somewhat broader, but in some specimens it is as narrow as in *chlorurus.* In preserved specimens the colour and markings are often very similar in both species.

4. **Cheilinus fasciatus** (Bl.). (Fig. 16, p. 74)

Sparus fasciatus Bloch, Ausländ. Fische V, 1791, p. 18.
Labrus enneacanthus Lacepède, Hist. Nat. Poissons III, 1802, p. 433, p. 480.
Cheilinus fasciatus Rüppell, Atl. Reise N. Afrika 1828, p. 23. — Neue Wirbelthiere, Fische 1837, p. 18.
Cheilinus fasciatus Cuvier & Valenciennes, Hist. Nat. Poissons XIV, 1839, p. 92.
Cheilinus fasciatus Bleeker. Verh. Bat. Gen. XXII, 1849. Gladsch. Labr., p. 31. — Atl. Ichth. I, 1862, p. 67.
Cheilinus fasciatus Günther, Cat. Brit. Mus. IV, 1862, p. 129.
Cheilinus fasciatus Kner, Novara Exp. Fische I, 1865—1867, p. 251.
Cheilinus fasciatus Günther, Fishes of Zanzibar, 1866, p. 89.
Chilinus fasciatus Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 555.
Chilinus fasciatus Günther, Fische der Südsee II, 1876—1881, p. 246.
Chilinus fasciatus Day, Fishes of India, Prt. III, 1877, p. 394.
Cheilinus enneacanthus Fowler, Journ. Acad. Nat. Sc. Philadelphia (2) XII, Prt. 4, 1904, p. 539.
Cheilinus fasciatus Jordan & Seale, Bull. Bur. Fish. XXV, (1905) 1906, p. 308.
Cheilinus fasciatus Seale, Occas. Papers B. P. Bishop Mus. IV, 1906, p. 58.
Cheilinus fasciatus Snyder, Proc. U. S. Nat. Mus. XLII, 1912, p. 508.

Wetmorella philippina Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 211.
Cheilinus fasciatus Fowler & Bean, ibid p. 350.
Cheilinus fasciatus Fowler, Mem. B. P. Bishop Mus. 1928, p. 360. — ibid. XI, 1931, p. 358.
Cheilinus fasciatus Whitley, Rec. Austr. Mus. XVIII, 1931, p. 114.
Cheilinus fasciatus Herre, Field Mus. Zool. Ser. XXI, 1936, p. 327.

D. IX. 10 (11). A. III. 8 (9). P. 2. 10. V. I. 5. Ll. 20—21.

Ltr. $\begin{array}{c}2\\\hline 1\\\hline 6\text{—}7\end{array}$.

Height 2.3—2.6, 2.9—3.5 in length with caudal. Head 2.5—2.9, 3.4—3.7 in length with caudal. Height of head equal to its length. Eye 4.4—7, 1.5—2.3 in convex interorbital space and 1.9—3.4 in snout, the upper profile of which is convex. Lips thick. Chin prominent in large specimens. Mouth slightly oblique, moderate, maxillary not quite reaching to below front-border of eye. A single row of conical teeth in the jaws, with two strong curved canines anteriorly in each jaw. Teeth white. Preopercle smooth, with two strong transverse rows of scales, leaving the posterior and inferior limb naked. Scales beginning on upper part of head above anterior half of eyes. Seven rows of scales before dorsal. Dorsal spines increasing in size posteriorly, the first equal to eye, the last equal to postorbital part of head. The membranes between the spines are not incised in adults. Soft dorsal higher than spinous part, rounded or slightly pointed, the 6th—8th rays longest, equal to head without snout. Origin of anal below 8th dorsal spine. First anal spine shortest, third longest, equal to postorbital part of head. Soft anal deeper than spinous part, rounded in young, pointed in older specimens, the 5th—6th rays being longest and equal to snout and eye together or even longer. Dorsal and anal with a well developed scaly sheath. Pectorals rounded, as long as head without snout. Ventrals slightly pointed, as long as snout in adults, equal to snout and eye in young specimens. Caudal rounded in young, in adults the outer upper and lower rays much produced. Colour of preserved specimens reddish brown, opercular region and belly generally lighter, yellowish. Some scales behind eye with a black mark, a similar streak along hind-border of operculum and at base of pectorals. Head with white stripes and anastomosing lines, partly broken up into spots, radiating from eye. Scales of anterior part of sides more or less speckled with dark brown. Seven light yellow transverse bands, one scale broad: the first on nape, the second to fourth from spinous dorsal, the fourth running to origin of anal. The fifth from soft dorsal to soft anal, the sixth on caudal peduncle, just behind dorsal and anal, and the seventh, which is much broader, at base of caudal. Spinous dorsal light reddish brown, with narrow white longitudinal bands, sinuous stripes and spots. Soft dorsal yellowish brown, with a large dark blotch in the middle of its base, its outerborder broadly dark brown, with numerous spots. Anal light brown, with numerous light spots and wavy lines, which also spread on the body. Soft anal with two basal black blotches, corresponding to the interspaces between the 4th—5th and 5th—6th light transverse bands, otherwise light brown, becoming darker towards the outerborder and covered with light spots as the spinous part of the anal. Pectorals hyaline. Ventrals light, darker at base. Caudal yellowish, with a dark basal and a still darker marginal band, spotted with yellowish; the rays, the prolonged outer ones included, yellowish brown. Length 343 mm.

Nomen indig.: Déan-déa (Malay), Lamèlulvau (Tapah, Simalur).

Habitat: Singapore; Sumatra (Siboga, Padang); Simalur!; Nias: Java (Batavia!); Duizend Islands; Borneo (Sandakan); Celebes (Makassar, Cape Kait, Libani Bay); Talaut Islands!; Sulu Islands!; Batjan; Makjan; Halmahera; Ambon; Sula Islands!; Flores; Solor!; Kei Islands!; Waigeu; Mysore; New Guinea (Manokwari, Port Moresby). — Madagascar, Mauritius, Seychelles, Zanzibar, Red Sea, coasts of British India, Riu Kiu Islands, Philippines, coast of Queensland, Solomon Islands, Pelew Islands, Guam, Carolines, Gilbert Islands, Fidji, Samoa, Tonga Islands. In sea.

5. **Cheilinus undulatus** Rüpp.

Cheilinus undulatus Rüppell, Neue Wirbelthiere, Fische 1835, p. 20.
Cheilinus undulatus Bleeker, Nat. Tijdschr. Ned. Indië IV, 1853, p. 492. — Atl. Ichth. I, 1862, p. 68.
Cheilinus undulatus Günther, Cat. Brit. Mus. IV. 1862, p. 129. — Fishes of Zanzibar 1866, p. 88.
Chilinus godeffroyi Günther, Proc. Zool. Soc. London 1871, p. 166.
Chilinus undulatus Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 552.
Chilinus undulatus Macleay, Proc. Linn. Soc. New S. Wales VII, 1882, p. 586.
Chilinus undulatus Day, Fishes of India, Suppl. 1888, p. 802.
Cheilinus undulatus Jordan & Seale, Bull. Bur. Fish. XXV, (1905) 1906, p. 309.
Cheilinus undulatus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 352.
Cheilinus undulatus Fowler, Mem. B. P. Bishop Mus. X. 1928, p. 361. — Acad. Nat. Sc. Philadelphia, Monogr. 2, 1938, p. 111.

D. IX. 10 1). A. III. 8. P. 2. 10. V. I. 5. Ll. 14 + 11. Ltr. $\frac{2}{\frac{1}{6}}$.

This species grows to an enormous length (over 2000 mm). The measurements show therefore great differences when we compare small with old specimens. The following description is based on a specimen of 420 mm length. Height 2.6, 3.1 in length with caudal. Head 2.7, 3.2 in length with caudal. Height of head 1.1 in its length. Profile of head sloping, with a prominent hump in old specimens. Eye 6.8, 2.7 in snout and 1.7 in interorbital space, which is somewhat keeled. Mouth slightly oblique. Maxillary not reaching to below eye. Two transverse rows of scales on preopercle, leaving a broad posterior and inferior limb naked. Four rows of scales before dorsal. First dorsal spine equal to eye, last not quite twice as long. Membranes between the dorsal spines not incised. Soft dorsal higher than spinous part, rounded behind. First anal spine short, third as long as last dorsal spine. Pectorals somewhat longer than ventrals, equal to snout and eye together. Caudal slightly rounded. Scaly sheath on dorsal and anal low. Colour of preserved specimens reddish brown, scales on anterior lower half of body with white lines and figures, on rest of body the scales have simple, somewhat undulating lines. A dark band from eye to posterior part of upper lip. Two distinct black lines from hindborder of eye, running parallel and obliquely upwards. Soft dorsal and anal with vertical or nearly vertical dark bands, as broad as the interspaces. Pectorals and ventrals reddish. Length over 2000 mm.

Habitat: Pulu Weh!; Java (Batavia!); Gomomo Island; New Guinea (Port Moresby). — Zanzibar, Red Sea, Ceylon, Philippines, Pacific Islands as far as Paumotu Islands. In sea.

6. **Cheilinus bimaculatus** C. V.

Cheilinus bimaculatus Cuvier & Valenciennes, Hist. Nat. Poissons XIV, 1839, p. 96.

Cheilinus ceramensis Bleeker, Nat. Tijdschr. Ned. Indië III, 1852, p. 290. — Atl. Ichth. I, 1862, p. 69.

Cheilinus ceramensis Günther, Cat. Brit. Mus. IV, 1862, p. 127. — Fische der Südsee II, 1881, p. 245.

Cheilinus melanopleura Bleeker, Ned. Tijdschr. Dierk. II, 1865, p. 275 (nomen nudum). — ibid. III, 1866, p. 134. Arch. Neerl. Sc. Nat. VI, (1870) 1871, Pl. VI, fig. 2.

Cheilinus bifasciatus Bleeker, ibid. p. 328.

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1) Bleeker gives as formula: D. VIII or IX.

Chilinus ceramensis M. Weber, Jenaische Denkschr. VIII, 1895, p. 111.
Chilinus bimaculatus Steindachner, Denkschr. Akad. Wien LXX, 1900, p. 504.
Cheilinus bimaculatus Jordan & Evermann, Bull. U. S. Fish Comm. XXIII, (1903) 1905, p. 320.
Cheilinus ceramensis de Beaufort, Bijdr. Dierkunde, Afl. XIX, 1913, p. 130.
Cheilinus bimaculatus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 344.
Cheilinus bimaculatus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 359.
Cheilinus bimaculatus P. J. Schmidt, Trans. Pac. Comm. Acad. U.S.S.R. I. 1930, p. 79.
Cheilinus bimaculatus Fowler, Acad. Nat. Sc. Philadelphia, Monogr. 2, 1938, p. 240.

D. IX. 10 (11). A. III. 8 (9). P. 2. 10. V. I.5. Ll. 20—22. Ltr. $\begin{array}{c}2\\ \hline 1.\\ \hline 6\end{array}$

Height 2.7—3.2, 3.3—3.9 in length with caudal. Head 2.8—3, 3.6—3.9 in length with caudal. Height of head 1.1—1.2 in its length. Eye 3.7—4.8, about equal to almost flat interorbital space and 1.2—1.6 in snout. Jaws equal. Chin scarcely prominent. Mouth somewhat oblique. Maxillary not quite reaching to below frontborder of eye. Conical teeth in a single row in jaws, with two canines anteriorly in each jaw. Teeth white. Praeoperculum smooth, with two transverse rows of scales, leaving only a very narrow space at its edge and along its hindborder naked. Scales on upper part of head beginning above middle of eyes. Seven or eight rows of scales before dorsal. First dorsal spine equal to eye, last spine longest, about equal to snout and half eye, not shorter than rays of soft dorsal, which is rounded and with a straight hindborder. Origin of anal below 8th dorsal spine. First anal spine shortest, somewhat more than eye. Third spine but little longer than second, as long as last dorsal spine. Soft anal pointed, the longest rays longer than spines. Dorsal and anal with a well developed scaly sheath. Pectorals rounded, as long as snout and half eye. Ventrals pointed, about half diameter of eye longer than pectorals. Caudal rounded, the upper and some of the median rays prolonged into filaments. Colour of preserved specimens light brownish. A dark brown blotch immediately behind eye and a larger one below lateral line and just behind extremity of pectoral. In some well preserved specimens a broad dark irregular band on sides, from head to caudal, fainter on tail and consisting of anastomosing patches, leaving light brownish patches between them. A dark brown blotch between first and second dorsal spine; remainder of spinous dorsal brownish, the colour getting gradually fainter posteriorly, but still visible on anterior part of soft dorsal. A marginal white border along spinous dorsal. Posterior part of soft dorsal white. Anal and caudal with brownish markings, forming more or less regular crossbars on latter. Pectorals and ventrals hyaline, lastnamed sometimes dusky near tip. Length 145 mm. (Specimens of *Ch. ceramensis* of Bleeker's collection in the Amsterdam Museum and types of *Ch. melanopleura* and *Ch. bifasciatus* in the Leiden Museum seen by me).

Habitat: Java (Palabuan Ratu!); Flores!; Solor; Timor; Ambon!; Ceram; Banda; New Guinea. — Maldives, Philippines, New Hebrides, Hawaii. In sea.

Note. We have united *Ch. melanopleura* Blkr and *Ch. bifasciatus* Blkr. with this species. When describing *Ch. melanopleura* Bleeker was apparently impressed by the large diffuse black blotch above the pectorals. In the type of *Ch. melanopleura* this blotch has now disappeared, and only a small spot, as large as eye, remains, just as in typical *Ch. bimaculatus*. Besides there is a distinct dark spot at base of caudal, which we also find in very small specimens but is absent in larger ones as a rule. In a specimen from the Philippines we find a similar large dark blotch on the sides of the body as Bleeker described for *melanopleura*, but in this specimen the blotch is followed by other similar but smaller blotches, forming together an incomplete band from head to caudal.

We have also united *Ch. bifasciatus* Blkr with *bimaculatus*. We have examined the type in the Leiden Museum. It differs from typical *bimaculatus* in lacking the spot above the end of the pectoral, but that behind the eye is very distinct. There is no broad continuous band along the sides, but a series of diffuse dark blotches, and also some blotches below dorsal. We find in our material several specimens with the same colouring, some of them having besides a small dark spot above pectoral, and others without it. In the type of *bifasciatus* the ventrals are spotted, but I do not think that this is a difference of importance.

7. **Cheilinus mentalis** Rüpp.

Cheilinus mentalis Rüppell, Reise N. Afrika, Fische des Rothen Meeres, 1828, p. 24.

Cheilinus mentalis Bleeker, Versl. Akad. Amsterdam XIV, 1862, p. 104.

Cheilinus coccineus Bleeker, Atl. Ichth. I, 1862, p. 71 (nec Rüppell).

Cheilinus orientalis Günther, Cat. Brit. Mus. IV, 1862, p. 132.

Chilinus mentalis Klunzinger, Verh. zool. bot. Gesellsch. Wien, XXI, 1871, p. 556.

Chilinus mentalis Kossmann & Räuber, Verh. Naturh. Med. Ver. Heidelberg I, 1876, p. 37.

D. IX. 10. A. III. 8. P. 2. 10. V. I. 5. Ll. 15 + 8. Ltr. $\begin{array}{c}2\\ \hline 1.\\ \hline 6\end{array}$

Height 3.8, 4.7 in length with caudal. Head 2.5, 3.1 in length with caudal; its height 1.8 in its length. Eye 5.5, 1.8 in snout and about equal to almost flat interorbital space. Mouth somewhat oblique. Maxillary reaching to below frontborder of eye. Lips thick. Corner of mouth far below horizontal through lower border of eye. Conical teeth in a single series in both jaws, with two large canines anteriorly in upper jaw and two smaller ones in lower jaw. Preopercle with two transverse rows of scales, leaving a narrow posterior and a broader inferior limb naked. Six rows of scales before dorsal. Scaly sheath of dorsal and anal very low. First dorsal spine equal to eye, last spine as long as snout. The membranes between the spines incised. Soft dorsal of same height as posterior part of spinous part, slightly rounded behind. Origin of anal below last dorsal spine. First anal spine equal to pupil, second to eye, third somewhat shorter than snout. Soft anal similar to soft dorsal. Pectorals and ventrals subequal, as long as postorbital part of head. Caudal slightly rounded. Colour of preserved specimen, which is rather faded, yellowish brown. A small reddish brown spot in front of eye. An irregular brown patch in lateral line below origin of dorsal, which has a faint dark spot in lower part of membrane between first and second spine. Rest of dorsal and of all other fins hyaline, probably faded. (Description made after a specimen of 104 mm from the Philippines). Length 189 mm.

Habitat: Batjan. — Philippines!, Red Sea.

Note. Bleeker had only one specimen in his collection, which he first recorded as *mentalis*, but afterwards, after having compared it with a specimen of *mentalis* from the Red Sea, he came to the conclusion that his specimen belongs to *coccineus* Rüpp. Bleeker's specimen is lost, at least it does not appear in the catalogue of the sale of his collection after his death and it is not in the Leiden Museum. Günther (l.c.) rightly saw that Bleeker's *coccineus* was not that of Rüppell, which is the same as *diagramma* Lac. and *radiatus* Bl. Schn. Günther described it as a new species under the name of *orientalis*, however without having seen the specimen.

Klunzinger (l.c.), who examined specimens from the Red Sea, says that *mentalis* is without doubt the same as *orientalis*, but in the synonymy *orientalis* appears with a querry. This may be a mistake, as another and even a double mistake occurs on the same line, where *"Cheilio radiatus* Blk." is mentioned as a synonym. Bleeker never recorded a fish under that name and it is clear that he meant *"Cheilinus"* for *"Cheilio"* and probably *"coccineus"* in stead of *"radiatus"*, as *"Cheilinus radiatus* Blk." already occurs under the synonymy of his *Ch. radiatus.*

8. **Cheilinus diagramma** (Lac.)

Sparus radiatus Bloch Schneider, Syst. Ichth. 1802, p. 270 (nec L.).
Labrus digramma Lacepède, Hist. Nat. Poissons III, 1802, p. 448, p. 517.
Cheilinus coccineus Rüppell, Atlas Reise N. Afrika, Fische, 1828, p. 23.
Cheilinus commersonii Bennett, Proc. Comm. Zool. Soc. London I, 1830—1831, p. 167.
Cheilinus diagramma Cuvier & Valenciennes, Hist. Nat. Poissons XIV, 1839. p. 98.
Cheilinus lacrymans Cuvier & Valenciennes, ibid. p. 109.
Cheilinus diagrammus Bleeker, Verh. Bat. Gen. XXII, 1849, Gladsch. Labr., p. 38.
Cheilinus radiatus Bleeker, Atl. Ichth. I, 1862, p. 68.
Cheilinus lacrymans Bleeker, ibid., p. 71.
Cheilinus radiatus Günther, Cat. Brit. Mus. IV, 1862, p. 131. — Fishes of Zanzibar, 1866, p. 90.
Cheilinus radiatus Klunzinger, Verh. zool. bot. Gesellsch. Wien XXI, 1871, p. 556.
Chilinus radiatus Günther, Fische der Südsee II, 1881, p. 247.
Chilinus radiatus Steindachner, Denkschr. Akad. Wien LXX, 1900, p. 504.
Cheilinus diagrammus Jordan & Seale, Bull. Bur. Fish. XXV, (1905) 1906, p. 309.
Chilinus radiatus Barnard, Ann. S. Afric. Museum XXI, 1925—1927, p. 765.
Cheilinus diagrammus Fowler, Mem. B. P. Bishop Museum X, 1928, p. 361.
Cheilinus diagrammus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 354.
Cheilinus diagrammus Herre, Field Mus. Zool. ser. XXI, 1936, p. 327.
Cheilinus unifasciatus Fowler, Acad. Nat. Sc. Philadelphia, Monogr. 2, 1938, p. 211. (nec Streets).

D. IX. 10 (11). A. III. 8 (9). P. 2. 10. V. I. 5. Ll. 21—22.

Ltr. $\frac{1\frac{1}{2}-2}{\frac{1}{6-7}}$.

Height 2.8—3.3, 3.3—3.8 in length with caudal. Head pointed, much longer than deep, 2.6—2.8, 3.1—3.4 in length with caudal. Eye 5.6—6, 1.2—1.4 in convex interorbital space and 2.3—2.7 in snout. Chin prominent. Lower jaw slightly included. Mouth oblique. Maxillary reaching to below nostrils or somewhat farther. Corner of mouth far below horizontal through lower border of eye. Conical teeth in a single row in the jaws, with two canines anteriorly in each jaw. Teeth white. Preopercle smooth, with two transverse rows of scales, leaving a broad posterior and inferior limb naked. Scales on upper part of head beginning above middle of eye. Six rows of scales before dorsal. Scaly dorsal and anal sheath low. First dorsal spine as long as eye, last one half diameter of eye longer. Membranes between dorsal spines incised, slightly lobate. Soft dorsal slightly higher than spinous part, rounded. Origin of anal below 8th or 9th dorsal spines. First anal spine shortest, third spine longest, about equal to twice diameter of eye. Soft anal similar to soft dorsal. Pectorals rounded, equal to postorbital part of head or slightly longer, and as long as rounded ventrals. Caudal slightly rounded. Colour of preserved specimens brown. White stripes (red in life) from eye to upper lip. Upper part of head with similar short stripes and spots. About 8 oblique narrow black lines, sometimes forked, on lower part of head; the first from corner of mouth backwards to isthmus, the following parallel to it on praeoperculum, interoperculum, suboperculum and operculum. Spinous dorsal and anal with cloudy brown markings. Soft dorsal and anal, pectorals and ventrals light yellowish hyaline. Caudal hyaline, the upper and lower rays brown, the middle rays green. Length 290 mm.

Nom. indig. Kakatua, Nuri-nuri (Malay, Batavia). Maming (Menado). Gagarim (Ternate). Meiningo (Batjan).

Habitat: Sumatra (Priaman, Padang); Simalur!; Nias!; Java (Batavia!); Borneo (Birabirahan); Bali; Lombok!; Celebes (Makassar, Menado, Kait Point, Limbe Strait, Dodepo and Pasejogo Islands in Gulf of Tomini); Sulu Islands!; Ternate; Kajoa; Tidore; Halmahera; Batjan; Ambon!; Banda!; New Guinea (Manokwari and South Coast). — Mozambique, Madagascar, Mauritius, Seychelles, Zanzibar, Red Sea, Riu Kiu Islands, Philippines, Pelew Islands, Solomon Islands, Northeast Australia, New Hebrides, Gilbert Islands, Fiji Islands, Samoa, Hawaii. In sea.

Note. *Ch. lacrymans* probably belongs to this species, Valenciennes described it very shortly after a specimen seen by him in the Leiden Museum and collected by Reinwardt in the Moluccas. This specimen is not any more in Leiden, but there are 3 specimens, labelled *lacrymans,* long about 180 mm, 170 mm, and 100 mm, collected by Kuhl and van Hasselt in Java. The first of these specimens, which is a mounted skin, has been described by Bleeker as *lacrymans,* thinking that it was the type. This came however from the Moluccas and not from Java. It is possible that the type is now in the British Museum. In the Catalogue l.c.

Günther cites among the specimens of *Ch. radiatus*: "b. Half-grown. Moluccas. From the Leyden Museum as *lacrymans*". Mr. Norman kindly gave me the following information about this specimen: "The specimen from the Leyden Museum (140 mm in total length) was put by Günther into the same bottle as the other specimen from the Moluccas mentioned in his catalogue and the original label appears to have been destroyed. The number in our register is still in existence but reference to this reveals no mention of this being the type. I expect you are quite right in regarding it as such but I am afraid the matter must remain not proven". I agree with Mr. Norman's last words. There is another reason which makes me doubt. Valenciennes says that his specimen was "sept pouces" = 189 mm and the specimen in the British Museum is only 140 mm.

9. **Cheilinus rhodochrous** Gthr.

Cheilinus rhodochrous Günther, Fishes of Zanzibar, 1866, p. 90.
Cheilinus hexagonatus Günther, Fische der Südsee II, 1876—1881, p. 247.
Cheilinus unifasciatus Streets, Bull. U. S. Nat. Mus. No. 7, 1877, p. 82.
Cheilinus zonurus Jenkins, Bull. U. S. Fish Comm. XIX, 1901, p. 56. — ibid. XXII, (1902) 1904, p. 464.
Cheilinus hexagonatus Jordan & Evermann, ibid. XXIII, (1903) 1905, p. 319.
Cheilinus rhodochrous Bamber, Journ. Linn. Soc. Zool. XXXI, 1915, p. 482.
Cheilinus cingulatus M. Weber, Siboga Exp. Fische, 1913, p. 365.
Cheilinus hexagonatus Jordan & Jordan, Mem. Carnegie Mus. X, 1922—1925, p. 73.
Cheilinus unifasciatus Fowler & Bean, Bull. U. S. Nat. Mus. 100, Vol. VII, 1928, p. 357.
Cheilinus unifasciatus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 362. — ibid. XI, 5. 1931. p. 358.
Cheilinus unifasciatus P. J. Schmidt, Trans. Pac. Comm. Acad. Sci. U.S.S.R., I, 1930, p 79.

D. IX. 10. A. III. 8. P. 2. 10. V. I. 5. Ll. 16 + 7—8. Sq.l. 21—22.

Ltr. $\begin{array}{c} 1\frac{1}{2}\text{—}2 \\ \hline 1 \\ \hline 6\text{—}7 \end{array}$.

Height 2.8—3.1, 3.4—3.9 in length with caudal. Head 2.5—2.6, 3.1—3.3 in length with caudal. Eye 6.1—6.8, 2.6—2.7 in snout and 1.2—1.3 in convex interorbital space. Lips rather thick. Mouth oblique or much oblique, chin prominent. Maxillary not quite reaching to below frontborder of eye. Corner of mouth about half diameter of eye below horizontal through lower border of eye. Conical teeth in a single row in the jaws, two strong canines anteriorly in each jaw. Teeth white. Praeoperculum smooth, with

2 transverse rows of scales, leaving a broad posterior and inferior limb naked. Scales beginning on upper part of head above middle of eyes. Six rows of scales before dorsal. First dorsal spine equal to eye, last spine half diameter of eye longer. Membranes between the spines deeply incised and prolonged on top of spines into a streamer-like short filament. Soft dorsal not higher than spinous part, rounded behind. Origin of anal a little behind vertical through last dorsal spine. First anal spine as long as first dorsal one, third anal spine longest, slightly longer than last dorsal spine. Soft anal similar to soft dorsal, rounded. Scaly sheath of dorsal and anal low. Pectorals rounded, slightly shorter than more pointed ventrals and equal to postorbital part of head. Caudal truncate, slightly rounded when expanded. Colour of preserved specimens reddish brown, lighter below. Scales of body darker in the centre. More or less conspicuous narrow dark brown lines radiating from the eye; one to upper base of pectorals, another parallel to it and above it, to hindborder of operculum. A light transverse band on caudal peduncle, immediately behind dorsal and anal. Membrane between first and second dorsal spine dark brown, rest whitish, light reddish brown above. First part of soft dorsal reddish brown, darker on base of membranes between last six rays, almost forming a dark blotch; rest of rays white. Anal reddish brown in its anterior part, white posteriorly. Pectorals hyaline, ventrals light brownish. Caudal white, outer rays light brownish. Length 436 mm. (Type of *Ch. cingulatus* in the Amsterdam Museum seen by us).

Habitat: Dowora; Binongka!; Sulu Islands!; Banda!. — Zanzibar, Red Sea, Riu Kiu Islands, Philippines, Yap, Johnston Islands, Hawaii, Fanning Islands. In sea.

Note. On my request Mr. Norman kindly compared the types of *Ch. rhodochrous* (145 mm) with the type of *Ch. hexagonatus* (214 mm) and concluded "that the two are probably identical. The former has a more slender body (3.6 in the length) and narrower head and more pointed snout, as well as an apparently different coloration, but I feel pretty certain that these differences are a matter of age."

10. **Cheilinus oxyrhynchus** Blkr.

Cheilinus oxyrhynchus Bleeker, Versl. Kon. Akad. Amsterdam XIII, 1862, p. 300. — Atl. Ichth. I, 1862, p. 73.
Cheilinus oxyrhynchus Günther, Cat. Brit. Mus. IV, 1862, p. 133.
Cheilinus oxyrhynchus Macleay, Descr. Cat. Austr. Fish II, 1881, p. 91.

Cheilinus oxyrhynchus Jordan & Snyder, Proc. U. S. Nat. Mus. XXIV, (1901) 1902, p. 653.
Cheilinus oxyrhynchus M. Weber, Siboga Exp. Fische 1913, p. 365.
Cheilinus oxyrhynchus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 362.
Cheilinus rostratus Fowler & Bean, Bull. U. S. Nat. Mus. 100, Vol. VII, 1928, p. 358.
Cheilinus oxyrhynchus P. J. Schmidt, Trans. Pac. Comm. Acad. Sci. U.S.S.R. 1930, p. 78.
Cheilinus oxyrhynchus Herre, Journ. Pan-Pacific Res. Inst. VI, No. 4, 1931, p. 8. — Field Mus. Zool. Ser. XXI, 1936, p. 328.

D. IX. 10 (11). A. III (8) 9. P. 2. 10. V. I. 5. Ll. 15 + 9 or 16 + 8. Ltr. $\frac{1\frac{1}{2}-2}{\frac{1}{6}}$.

Height 3.2—3.5, 3.8—4.1 in length with caudal. Head 2.5—2.6, 3—3.1 in length with caudal. Height of head 1.6 in its length. Eye 5.3—6, 2.1—2.5 in the pointed snout and equal to or slightly less than the interorbital space, which is slightly convex in young and more so in old specimens. Profile of snout with a slight concavity just above eye. Mouth slightly oblique, rather large. Maxillary ending one eye diameter before vertical through anterior border of eye. Corner of mouth about half diameter of eye below horizontal through inferior border of eye. Teeth whitish, in a single row in the jaws. Two canines anteriorly in each jaw. Praeoperculum smooth, with two transverse rows of scales, leaving a rather broad posterior and a very broad inferior limb naked. Scales on upper part of head beginning above middle of eyes. Six rows of scales before dorsal. First dorsal spine as long as eye, last spine slightly less than postorbital part of head. Membranes between the dorsal spines deeply incised. Soft dorsal about of same height as spinous part, somewhat rounded posteriorly. Origin of anal below interspace between 8th and 9th dorsal spines. First anal spine equal to eye, third spine longest, slightly less than postorbital part of head. Soft anal similar to soft dorsal. Scaly sheath of dorsal and anal very low. Pectorals and ventrals subequal, rounded, as long as postorbital part of head. Caudal slightly rounded. Colour of preserved specimens reddish brown, the scales with a dark brown hindborder. Two narrow diverging dark brown bands from hindborder of eye to operculum, which has some irregular dark markings. A broad irregular longitudinal dark brown band on middle of caudal peduncle. A dark spot between first and second dorsal spines; rest of spinous dorsal with brown cloudy markings, more pronounced and forming a more or less distinct network on soft dorsal. Anal with similar markings, sometimes forming washed blotches along the base of the fin. Caudal with numerous wavy narrow crossbars, consisting of rows of spots. Pectorals hyaline. Ventrals with an indistinct crossbar. Length 145 mm.

Habitat: Celebes (Makassar, Menado); Ambon; Batjan; Kei Islands! — Japan, Riu-Kiu Islands, Philippines, Pelew Islands, coast of Queensland, Solomon Islands. In sea.

Note. The species *Ch. oxyrhynchus, Ch. arenatus* and *celebicus* are perhaps only varieties of one species.

11. **Cheilinus arenatus** C. V.

Cheilinus arenatus Cuvier & Valenciennes, Hist. Nat. Poissons XIV, 1839. p. 101.
Cheilinus notophthalmus Bleeker, Nat. Tijdschr. Ned. Indië IV, 1853, p. 493. — Atl. Ichth. I, 1862, p. 72.
Cheilinus arenatus Günther, Cat. Brit. Mus. IV, 1862, p. 132.
Cheilinus arenatus Tate Regan, Trans. Linn. Soc. London XII, (3) 1908, p. 231.

D. IX. 10 (11). A. III. 8 (9). P. 2. 10. V. I. 5. Ll. 15 + 6—8. Ltr. $\begin{array}{c}2\\ \hline 1.\\ \hline 6\end{array}$

Height 3.1—3.2, 3.8 in length with caudal. Head 2.5—2.8, 3—3.3 in length with caudal. Height of head 1.4—1.5 in its length. Upper profile of head somewhat concave above eyes. Eye 4.8—6.2, 1.7—2.6 in snout and 1.1 in somewhat convex interorbital space. Mouth somewhat oblique. Maxillary reaching to below anterior nostril. Conical teeth in a single series in both jaws, two curved canines anteriorly in upper jaw, two smaller ones anteriorly in lower jaw. Preopercle smooth, with two transverse rows of scales, leaving a broad inferior and a narrower posterior limb naked. Six rows of scales before dorsal. First dorsal spine equal to or slightly shorter than eye, last spine as long as snout or somewhat shorter, as long as longest dorsal ray. The membranes between the dorsal spines slightly incised. First anal spine somewhat shorter than eye. Third spine slightly longer than last dorsal spine. Soft anal similar to soft dorsal, rounded. Pectorals and ventrals subequal, as long as snout. Caudal slightly rounded. Colour of preserved specimens brownish red, somewhat lighter below. Head uniform or with traces of a few white lines from eye to snout. Scales of body with a more or less distinct vertical dark brown stripe. According to Cuvier and Valenciennes and Bleeker there is a dark band from eye to caudal, but in the type of *notophthalmus* this band is not visible and in another specimen it is only distinct on the caudal peduncle, where it ends in a dark blotch. Dorsal and anal whitish, freckled and striped with brownish. A dark brown blotch between the first and second and between the second and third dorsal spines. Caudal with faint brownish vertical bands. Spines and rays of vertical fins more or less greenish. Ventrals dusky at base. Pectorals hyaline. Length 237 mm. (Type of *Ch. notophthalmus* in the Leiden Museum seen by me).

Habitat: Java (Batavia!); Ternate. — Mauritius, Cargados Carajos, Philippines!. In sea.

Note. About the validity of this species see note under *Ch. oxyrhynchus.*

12. **Cheilinus celebicus** Blkr. (Fig. 17, p. 95)

Cheilinus celebicus Bleeker, Nat. Tijdschr. Ned. Indië V, 1853, p. 171. — Atl. Ichth. I, 1862, p. 70.
Cheilinus Hoeveni Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 297. — Atl. Ichth. l. c.
Cheilinus celebicus Günther, Cat. Brit. Mus. IV, 1862, p. 133.
Cheilinus rostratus Cartier, Verh. phys. med. Ges. Würzburg 1874, p. 103.
Cheilinus rostratus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 358.
Cheilinus kitlitzii Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 362 (nec C. V.).

D. IX. 10 (11). A. III. 8 (9). P. 2. 10. V. I. 5. Ll. 15—16 + 8—9. Ltr. $\begin{array}{c} 1\frac{1}{2}-2 \\ \hline 1 \\ \hline 6-7 \end{array}$.

Height 2.8—3.3, 3.4—4 in length with caudal. Head 2.4—2.8, 3—3.2 in length with caudal. Height of head 1.5—1.6 in its length. Eye 5.6—6.7, 1.3—1.4 in slightly convex interorbital space and 2.3—2.7 in the long, pointed snout, the upper profile of which shows a more or less pronounced concavity just before eyes. Mouth slightly oblique, rather large, but as the snout is long the maxillary reaches by far not below anterior border of eye. Corner of mouth about half diameter of eye below horizontal through lower border of eye. Conical teeth in a single row in jaws, with two canines anteriorly in each jaw. Teeth slightly greenish. Praeoperculum smooth, with two transverse rows of scales, leaving a broad posterior and a still broader inferior limb naked. Scales beginning on upperpart of head above middle of eyes. Six or seven rows of scales before dorsal. First dorsal spine equal to eye or somewhat shorter, last as long as, or shorter than postorbital part of head. The membranes between the spines not incised. Anterior dorsal rays not longer than last spine, posterior rays somewhat longer, the fin being moderately pointed. Origin of anal below interspace between 8th and 9th dorsal spines. First anal spine shortest, equal to eye. Third one longest, slightly longer than last dorsal spine. Soft anal similar to soft dorsal. Scaly sheath of dorsal and anal low. Pectorals and ventrals rounded, subequal, as long as postorbital part of head. Caudal slightly rounded. Colour of preserved specimens olive brown, lighter and sometimes with a greenish hue below. A dark brown blotch at end of operculum, irregularly encircled by white, may be present. An indistinct broad band from eye to caudal, generally more conspicuous in its posterior part, where it is broken up in a series of large cloudy blotches. Many of the scales of sides with dark reddish markings. White stripes (red in life) radiating from eye in all directions excepting cheeks; two running to maxillaries, one ending on middle of snout; from the more superior stripes the first is connected with that of the other side, the following are broken into short stripes or spots. Similar spots on snout and in crowded vertical rows on scales of body. Spinous dorsal olive brown, marbled with white. A black blotch between first and second spines. Spines light greenish or blue. Soft dorsal olive brown, with oblique white bands; the rays blue. Caudal white, freckled with brown, the rays blue, with exception of the upper and lower rays, which are white. Pectorals hyaline, the rays white. Ventrals dark brown, the outerborder, the spine and the rays white. Length 190 mm (Specimens of Bleeker's collection and type of *Ch. hoeveni* in the Leiden Museum seen by me).

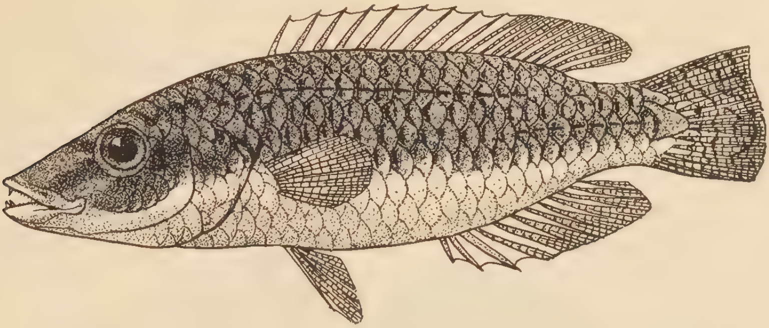

Fig. 17. *Cheilinus celebicus* Blkr. × 4/5.

Habitat: Simalur!; Celebes (Makassar, Labuandata, Menado); Cape Kait; Sangi Islands; Gomumu; Dowora; Obi major; Makian; Kayoa; Tidore; Halmahera; Buka buka; Ambon!; Kei Islands!; New Guinea (Manokwari). — Philippines, Solomon Islands. In sea.

Note. Fowler l.c. has united this species with *Ch. kitlitzi* C. V. This species is based on a drawing made at Ulea and the description is too imperfect to allow any definite conclusion.

14. **Pseudocheilinus** Bleeker

(Bleeker, Proc. Zool. Soc. London 1861, p. 409. — Versl. Kon. Akad. Amsterdam XIII, 1862, p. 95)

Oblong, compressed, head pointed. Body covered with large scales, which form a sheath on dorsal and anal. Base of caudal covered with three very large scales, the median one longest. Lateral line interrupted. Preopercle smooth, with two transverse rows of scales. Mouth small. Lips not very thick. Eight canines anteriorly in upper jaw, the lateral ones very long, tusk-like, bent backwards and outwards. Sides of upper jaw with a series of small teeth. Similar teeth in the lower jaw, with two short canines anteriorly. Dorsal consisting of IX spines and 11 or 12 soft rays. Anal with three spines the second of which is longer than the others, and 9 soft rays. Pectorals rounded. Ventrals somewhat pointed. Caudal rounded.

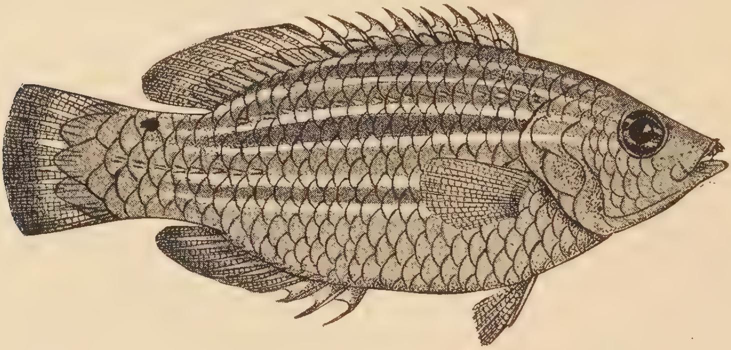

Fig. 18. *Pseudocheilinus hexataenia* (Blkr.)

Distribution: A few species, possibly only colour varieties of a single species, living on coral reefs or in rockpools in the tropical parts of Indic and Pacific.

1. **Pseudocheilinus hexataenia** (Blkr) (Fig. 18, p. 96)

Cheilinus hexataenia Bleeker, Act. Soc. Indo-Neerl. II. Achtste bijdrage vischfauna Ambon, 1857, p. 84.
Pseudocheilinus hexataenia Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 276. — Atl. Ichth. I, 1862, p. 73.
Pseudocheilinus hexataenia Günther, Cat. Brit. Mus. IV, 1862, p. 134.
Pseudocheilinus psittaculus Kner & Steindachner, Sitzber. Akad. Wien LIV, 1866, p. 376.
Cossyphus echis Guichenot, Nouv. Arch. Mus. Hist. Nat. V, 1869, p. 197.
Pseudochilinus hexataenia Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 557.
Pseudochilinus hexataenia Günther, Fische der Südsee II, 1881, p. 250.
Pseudochilinus hexataenia Steindachner, Abh. Senckenb. naturf. Ges. XXV, 1901, p. 441. — Sitzber. Akad. Wien, CXV, 1906, p. 1398.
Pseudocheilinus hexataenia Jordan & Seale, Bull. Bur. Fish. XXV, (1905) 1906, p. 311.
Pseudocheilinus hexataenia M. Weber, Siboga Exp. Fische, 1913, p. 366.
Pseudocheilinus hexataenia Fowler & Bean. Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 341.
Pseudocheilinus hexataenia Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 358.
Pseudocheilinus hexataenia Herre, Field Mus. Zool. ser. XXI, 1936, p. 325.
Pseudocheilinus hexataenia Fowler, Acad. Nat. Sc. Philadelphia, Monogr. 2, 1938, p. 239.

D. IX. 12. A. III. 9. P. 2. 13—14. V. I. 5. Ll. 17 + 6 or 18 + 8. Sq. l. 23. Ltr. $\begin{array}{c}1\frac{1}{2}\\\hline 1\\\hline 6\end{array}$.

Height 2.3—2.6, 2.8—3 in length with caudal. Head 2.8—2.9, 3.4—3.6 in length with caudal. Eye 3.8—4.7, 1.3—1.5 in pointed snout and equal to or slightly less than flat interorbital space. Mouth small, almost horizontal. Corner of mouth far before eye. Preopercle with two transverse rows of scales, leaving the lower limb naked. Scales on upperpart of head beginning above hind-border of eyes. Five rows of scales before origin of dorsal. Dorsal spines subequal, excepting the first, which is shorter, their length somewhat less than postorbital part of head. Membranes between the spines incised, each spine with a short filament. Soft dorsal rounded, the longest rays longer than spines. Origin of anal about below last dorsal spine. Second anal spine as long as snout, longer than first and third. Each spine with a long filament. Soft anal similar to soft dorsal. Pectorals rounded, as long as the somewhat more pointed ventrals and equal to postorbital part of head and half diameter of eye. Caudal slightly rounded. Colour of preserved specimens greenish, lower part of head reddish brown. Three longitudinal dull red bands on body below the lateral line. Each band bordered above and below by bright light greenish blue bands, which form together six conspicuous longitudinal stripes. Fins blue. Two brown spots on chin and a similar spot on upper part of caudal peduncle at base of caudal. Length 340 mm.

Habitat: Kabala-dua in Strait of Makassar; Talisse Island; Solor!; Goram; Ambon; Ternate; Halmahera; Karkaralong Islands!. — Madagascar, Red Sea, Ceylon, Philippines, Duke of York Island, Rotuma, Fiji, Phoenix Island, Samoa, Society Islands, Paumotu Islands, Hawaii. In sea on coral reefs.

15. **Anampses** (Cuvier) Quoy & Gaimard

(Quoy & Gaimard, Voyage Uranie et Physicienne. Zool. 1824, p. 276).
Pseudanampses Bleeker, Atl. Ichth. I, 1862, p. 101.
Ampheces Jordan & Snyder, Proc. U. S. Nat. Mus. XXIV, 1902, p. 628.

Oblong, compressed, body covered with large or moderate scales, those before ventrals and before dorsal much smaller, pointed, sometimes granulate or partly imbedded in the skin. Lateral line continuous, running anteriorly in the upper part of the body, sharply deflected below middle of soft dorsal and continued on middle of caudal peduncle. Head naked, the scales beginning behind eyes. Mouth somewhat protractile, small or very small. The lips rather thick and with a few plates at their inner side. A single series of minute teeth in the jaws, scarcely perceptible, and two large incisivi in front, directed forward, compressed and with a cutting edge; those of the upper jaw generally larger and more chisel-like than those of the lower jaw. Preopercle smooth. Dorsal consisting of IX flexible or stiff spines and 12 soft rays. Anal with

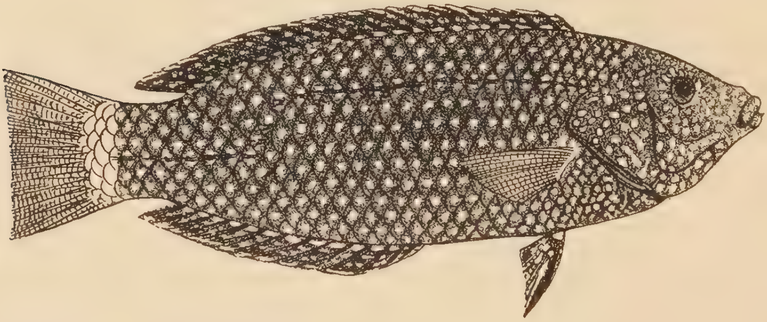

Fig. 19. *Anampses meleagrides* C. V. × 5/9

III flexible or stiff spines and 12 soft rays. Caudal truncate or emarginate. Pectorals moderately rounded. Ventrals with one spine and 5 rays, the first ray sometimes a little produced.

Distribution: Coasts of tropical and subtropical Indic and Pacific.

Note. Probably some of the species described are only colour varieties.

Key to the Indo-australian species of Anampses

I. Ll. 49—51 (*Pseudanampses*).
  A. Head with light bands, no ocelli on dorsal and anal . . . . 1. *A. geographicus* p. 99.
  B. Head without bands, a large black white-edged ocellus on posterior part of dorsal and anal . . . . 2. *A. pterophthalmus* p. 101.
II. Ll. 27—30.
  A. Head with white spots, without bands.
    1. Dorsal and anal with light spots or short stripes. A large black, white-edged ocellus on posterior part of dorsal and anal may be present. Caudal uniform yellowish . . . . 3. *A. meleagrides* p. 102.
    2. Anal with a longitudinal band. A broad dark vertical band through caudal. Opercle with a dark spot. Spots on head rather large . . . . 4. *A. melanurus* p. 103.
  B. Head with light bands. Scales of body with light spots or streaks.
    1. Dorsal and anal with longitudinal bands . . . . 5. *A. amboinensis* p. 103.
    2. Dorsal with ocelli, anal with longitudinal bands . . . . 6. *A. diadematus* p. 104.
    3. Dorsal and anal with ocelli . . . . 7. *A. caeruleopunctatus* p. 105.
  C. Head with a broad postocular brown band, edged above and below with white lines. Spots on sides of head and thorax. Scales of body with short vertical pearly bars . . . . 8. *A. neoguinaicus* p. 107.
  D. Head without bands or spots. A black blotch on opercular flap, with a white spot above it. A large dark ocellus on posterior part of dorsal and anal . . . 9. *A. twistii* p. 107.

1. **Anampses geographicus** C. V.

Anampses geographicus Cuvier & Valenciennes, Hist. Nat. Poissons XIV, 1839, p. 10.

Anampses geographicus Bleeker, Acta Soc. Sc. Indo-Neerl. I, 1856, p. 58. — Atl. Ichth. I, 1862, p. 102.
Anampses geographicus Günther, Cat. Brit. Mus. IV, 1862, p. 137.
Anampses geographicus Jordan & Snyder, Proc. U. S. Nat. Mus. XXIV (1901), 1902, p. 628.
Anampses geographicus Jordan & Seale. Bull. Bur. Fish. XXV, (1905) 1906, p. 296.
Anampses geographicus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 331.
Anampses geographicus Fowler & Bean, Bull. U. S. Nat. Mus. 100, Vol. VII, 1928, p. 226.

D. IX. 12. A. III. 12. P. 2. 11. V. I. 5. Ll. 51. Ltr. $\begin{array}{c}6\\\hline 1\\\hline 19\end{array}$.

Height 3, 3.6 in length with caudal. Head 3, 3.7 in length with caudal. Height of head 1.2 in its length. Eye 7.8, 2.8 in snout and twice in convex interorbital space. Mouth oblique, protractile, small. Maxillary not reaching to below anterior nostril. Lips rather thick, plated. Scales beginning above middle of eye; about 19 scales before dorsal. These scales as well as those between isthmus and ventrals are much smaller than those of the rest of the body, and granulose. First dorsal spine as long as eye, last spine twice as long. Membranes between the spines incised. Soft dorsal rounded above, the longest ray as long as snout, somewhat pointed behind. First anal spine very small, hidden in the skin; third spine longest, not quite twice diameter of eye. Soft anal similar to soft dorsal. Pectorals equal to postorbital part of head and half eye. Ventrals with the first and second rays somewhat produced, slightly shorter than pectorals. Caudal emarginate, the lobes somewhat produced. Least height of caudal peduncle equal to postorbital part of head. Colour of preserved specimens dark chocolate brown, all the scales of sides and belly with a light spot or vertical streak. A broad pinkish band connecting eyes over snout. Below and parallel to it two narrower bands, one from eye to snout, not connected with that of the other side, the third from below eye to upper lip and here continuous with that of the other side. Posteriorly this band is continued and deflected on preopercle. Behind eye several narrow light bands, some of them bifurcating or interrupted. Lower part of head, and breast to ventrals with similar bands, stripes and spots, one of these bands running from preopercle to ventrals. Dorsal and anal brownish violet, with a terminal brownish band, followed by a subterminal white band; rest of fins with white spots and stripes. On anal also a narrow longitudinal light band, parallel with the terminal one. Caudal brown with lighter hieroglyphs and a broad white terminal band. Ventrals dark brown, lighter near tip, with a narrow white outer border and a similar white band between the second and third rays. Pectorals yellowish brown, bluish towards tip. Length 235 mm.

Habitat: Sulu Islands!; Ceram; Misol; South New Guinea. — Mauritius, Riu Kiu Islands, Philippines, Paumotu Islands. In sea.

2. **Anampses pterophthalmus** Blkr.

Anampses pterophthalmus Bleeker, Acta Soc. Sc. Indo-Neerl. II, 1857. Achtste bijdrage vischf. Amboina, p. 81. — Atl. Ichth. I, 1862, p. 102.
Anampses pterophthalmus Günther, Cat. Brit. Mus. IV, 1862, p. 138.
Anampses pterophthalmus Jordan & Richardson, Bull. Bur. Fish. XXVII, (1907) 1908, p. 265.
Anampses pterophthalmus M. Weber, Siboga Exp. Fische, 1913, p. 367.
Anampses pterophthalmus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928. p. 225.

D. IX. 12. A. III. 12. P. 2. 11. V. I. 5. Ll. 49—50. Ltr. $\begin{array}{c}7\\ \hline 1\\ \hline 19\end{array}$.

Height 3, 3.5 in length with caudal. Head 3, 3.5 in length with caudal. Eye 6, 2.4 in snout and 1.6 in convex interorbital space. Mouth moderate, somewhat oblique. Maxillary not reaching to below anterior nostril. Lips rather thick, plated. Scales beginning behind eye. About 19 rows of small, granulated scales before dorsal. Similar small scales between isthmus and ventrals. Dorsal spines stiff and pungent. First spine equal to eye, last not quite twice eye. Membranes between the spines not incised. Soft dorsal not much higher than spinous part, the longest ray as long as snout; fin rounded behind. Anal spines stiff and pungent. First equal to eye, third longest, slightly shorter than longest dorsal spine. Soft anal similar to soft dorsal. Pectorals slightly more than snout and eye together. Ventrals without produced rays, slightly more than snout. Caudal truncate or slightly rounded. Least height of caudal peduncle equal to postorbital part of head. Colour of preserved specimen dark brown, head and tail somewhat lighter. Dorsal and anal dark brown, with a few lighter spots and stripes and with a large black white-edged ocellus on last soft rays. Caudal light brown, with a narrow white hindmargin. Pectorals yellowish. Ventrals dark brown. Length 210 mm.

Habitat: Sulu Islands!; Karkaralong Islands!; Celebes; Makian; Ceram; Ambon; Timor; New Guinea (Port Moresby). — Philippines, Engineer Group, Oualan. In sea.

3. **Anampses meleagrides** C. V. (Fig. 19, p. 98)

Anampses meleagrides Cuvier & Valenciennes, Hist. Nat. Poissons XIV, 1839, p. 12.

Anampses meleagrides Bleeker, Acta Soc. Sc. Indo-Neerl. I, 1856, Beschr. nieuwe vischs. Amboina, p. 57. — Atl. Icht. I, 1862, p. 103.

Anampses meleagrides Günther, Cat. Brit. Mus. IV, 1862, p. 135. — Fishes of Zanzibar, 1866, p. 91.

Anampses meleagrides Fowler & Bean, Bull. U. S. Nat. Mus. 100, Vol. VII, 1928, p. 227.

Anampses meleagrides P. J. Schmidt, Trans. Pac. Comm. Acad. Sc. USSR. I, 1930, p. 73.

D. IX. 12. A. III. 12. P. 2. 11. V. I. 5. Ll. 27—28. Ltr. $\begin{array}{c}3\text{—}4\\ \hline 1\\ \hline 10\end{array}$.

Height 3, 3.6 in length with caudal. Head 3.1—3.2, 3.8 in length with caudal. Height of head 1.2 in its length. Eye 7.2—7.8, 2.2—2.5 in snout and 1.8—2 in convex interorbital space. Mouth very small. Maxillary by far not reaching vertical through anterior nostril. About 10 rows of small scales, partly imbedded in the skin, before dorsal. Scales beginning behind eye. Similar small scales between isthmus and ventrals. Dorsal spines flexible, not pungent. First spine about as long as eye, last spine about twice eye. Soft dorsal somewhat higher, longest ray about thrice eye. Anal spines soft and flexible. First about equal to eye, third longest, about twice eye. Soft anal similar to soft dorsal. Pectorals equal to postorbital part of head or somewhat longer. Ventrals with the first ray slightly produced, slightly shorter than pectorals. Caudal truncate or slightly emarginate in older specimens. Least height of caudal peduncle equal to postorbital part of head. Colour of preserved specimens reddish brown. Head and body covered with white spots, more or less elongate into short stripes on opercular region and behind isthmus. On sides of body each scale has one spot, about as large as pupil. Dorsal and anal reddish brown, narrowly bordered with white. A white spot or longitudinal stripe basally between each spine and ray. Smaller white spots, sometimes elongate into stripes, scattered on the fins. A white-edged dark brown ocellus may be present between 10th and 11th rays of dorsal and anal. Caudal light yellowish. Pectorals hyaline, with a white line along their base. Ventrals brown, with white stripes and spots. Length 182 mm.

Habitat: Ambon; Banda!. — Zanzibar, Mauritius, Ceylon, Riu Kiu Islands, Philippines. In sea.

4. **Anampses melanurus** Blkr.

Anampses melanurus Bleeker, Acta Soc. Sc. Indo-Neerl. II, 1857, Achtste bijdr. vischf. Amboina, p. 79. — Atl. Ichth. I, 1862, p. 103.
Anampses melanurus Günther, Fische der Südsee II, 1881, p. 252.
Anampses melanurus Steindachner, Sitzber. Akad. Wien CXV, 1906, p. 1398.

D. IX. 12 (13). A. III. 12 (13). P. 2. 11. V. I. 5. Ll. 27—29.

Height about 3.3, nearly 4 in length with caudal. Head 3, about 3.5 in length with caudal. Eye 4, about 1.3 in snout and 1.2 in interorbital space. Mouth rather oblique. Dorsal spines pungent, posterior ones somewhat longer than the others, thrice or more than thrice in height of body. Soft dorsal slightly higher than spinous part. Third anal spine about as long as longest dorsal spine. Soft anal similar to soft dorsal. Pectorals triangular, about equal to postorbital part of head. Ventrals pointed, slightly shorter than pectorals. Caudal rounded. Colour dark, with light irregular spots, bordered with dark, on the head. Scales of body each with a similar but much smaller spot. A black blotch on posterior part of opercle. Dorsal with similar spots as on the body. Anal with longitudinal bands. Caudal light, with a broad dark subterminal vertical band. A dark stripe along base of pectorals. Length 114 mm. (Type in the British Museum examined).

Habitat: Ambon! — Samoa. In sea.

5. **Anampses amboinensis** Blkr.

Anampses amboinensis Bleeker, Acta Soc. Sc. Indo-Neerl. II, 1857. Achtste bijdr. vischf. Amboina, p. 80. — Versl. Akad. Amsterdam XIII, 1862, p. 282. — Atl. Ichth. I, 1862. p. 103.
Anampses amboinensis Günther, Cat. Brit. Mus. IV, 1862, p. 137.
Anampses lunatus Sauvage, Poissons de Madagascar 1891, p. 459.
Anampses amboinensis Herre, Notes Fish Zool. Mus. Stanf. Univ. 1931, p. 73.

D. IX. 12. A. III. 12. P. 2. 11. V. I. 5. Ll. 28. Ltr. $\begin{array}{c}2\frac{1}{2}\\ \hline 1\\ \hline 10\end{array}$.

Height 3.3—3.4, 4.2—4.3 in length with caudal. Head 3.2—3.3, 4—4.2 in length with caudal. Height of head 1.2 in its length. Eye 6.6—6.8, 2.2—2.6 in snout and 1.9—2.1 in convex interorbital space. Mouth small, somewhat oblique and moderately protractile. Maxillary not reaching to below anterior nostril. Lips rather thick, the upper lip plated. Scales beginning above hinderhalf of eye. About 19 rows of scales before dorsal. These scales as well as those between isthmus and ventrals much smaller than those of rest of body. Dorsal spines flexible, not pungent. First spine as long as eye, last spine as long as snout. Membranes between the spines not incised. Soft dorsal somewhat higher than spinous part, the longest rays almost equal to snout and eye. First anal spine minute, third longest, almost as long as snout. Soft anal similar to soft dorsal. Ventrals with the first ray produced, equal to head without snout, and somewhat longer than pectorals. Caudal truncate, but the outer upper and lower rays produced and curved. Least height of caudal peduncle equal to length of snout and eye together. Colour of preserved specimens reddish brown. Preopercle, interopercle and opercle with dark stripes and spots. Scales between isthmus and ventrals, and of belly with dark spots, forming longitudinal rows. Dorsal and anal reddish brown, with a narrow black submarginal and a narrow white terminal band. Dorsal with three, anal with two bluish gray longitudinal bands, each band narrowly bordered with black above and below. Caudal reddish brown, but lighter distally, the two colours sharply separated by a black narrow line, followed distally by a white band. These lines form a curve with the concavity hindwards and run from tip of upper lobe to that of lower lobe, the lobes belonging to the dark part of the fin. This dark part with several irregular transverse rows of light, black-edged ocelli. Length 203 mm.

Habitat: Sulu Islands; Ambon. — Zanzibar, Mauritius, Philippines!. In sea.

6. **Anampses diadematus** Rüpp.

Anampses diadematus Rüppell, Neue Wirbelthiere, Fische, 1835, p. 21.
Anampses diadematus Cuvier & Valenciennes, Hist. Nat. Poissons XIV, 1839, p. 14.
Anampses diadematus Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 533.
Anampses taeniatus Sauvage, Poissons de Madagascar, 1891, p. 457.
Anampses diadematus Fowler, Mem. B. P. Bishop Mus. X. 1928, p. 333.
Anampses diadematus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 230.

D. IX. 12. A. III. 12. P. 2. 11. V. I. 5. Ll. 28. Ltr. $\begin{array}{c}3\\ \hline 1\\ \hline 12\end{array}$.

Height 2.5, 3 in length with caudal. Head 2.7, 3.2 in length with caudal. Height of head 1.1 in its length. Eye 8.1, 3.1 in snout and 2.3 in very convex interorbital space. Mouth moderately protractile, small, somewhat oblique. Maxillary by far not reaching below anterior nostril. Lips rather thick, plated. Squamation beginning behind eye with about 10 rows of small scales, imbedded in the skin, to origin of dorsal. Breast with similar scales. Dorsal spines low, flexible. Their membranes thick, not incised. First dorsal spine shorter than eye, last about twice eye. Longest dorsal ray about thrice eye. Dorsal pointed behind. First anal spine about equal to eye, third longest, not quite twice eye. All spines flexible. Soft anal similar to soft dorsal. Pectorals equal to head without snout. Ventrals pointed, but without produced rays, equal to snout. Caudal truncate. Colour of preserved specimen brownish violet. Scales of body with a lighter vertical streak. Sometimes a broad vertical diffuse band below dorsal, and the head and body before this band of somewhat darker colour than the body and tail behind it. A broad light band connecting eyes over interorbital space and a much narrower one behind it, running vertically from upper border of eye. Axil of pectorals very dark brown. Dorsal brownish violet, with round or elongate light ocelli and a broad light outer border. Anal light yellowish, with brown basal and subterminal longitudinal bands. Caudal with the outer and middle rays light yellowish, the intermediate rays brown, forming two more or less distinct longitudinal bands on the fin. Ventrals yellowish, with a brownish longitudinal streak. Pectorals yellowish. Length 263 mm.

Habitat: Binang Unang Island, Celebes; Misol. — Madagascar, Zanzibar, Red Sea, Aden, Seychelles, Mauritius, Philippines!, Samoa, Gilbert Islands, Paumotu Islands. In sea.

7. **Anampses caeruleopunctatus** Rüpp.

Anampses caeruleo-punctatus Rüppell. Atlas Reise N. Afrika, Fische, 1828, p. 42.

Anampses caeruleo-punctatus Cuvier & Valenciennes, Hist. Nat. Poissons XIV, 1839, p. 5.

Anampses coeruleopunctatus Bleeker, Nat. Tijdschr. Ned. Indië XIX, 1859, p. 342. — Atl. Ichth. I, 1862, p. 104.

Anampses caeruleo-punctatus Günther, Cat. Brit. Mus. IV, 1862, p. 135.

Anampses caeruleopunctatus Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 534.

Anampses caeruleopunctatus Day, Fishes of India, Part III, 1877, p. 395.

Anampses caeruleopunctatus Günther, Fische der Südsee, II. 1881, p. 251.

Anampses caeruleopunctatus Seale, Occas. Papers B. P. Bishop Mus. I, No 3, 1901, p. 85.

Anampses caeruleopunctatus Jordan & Seale, Bull. Bur. Fish. XXV (1905), 1906, p. 295.

Anampses caeruleo-punctatus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 228.

Anampses caeruleo-punctatus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 333. — ibid. XI, 1931, p. 354.

Anampses caeruleopunctatus P. J. Schmidt. Bull. Acad. Sc. URSS. 1930, p. 550.
Anampses caeruleo-punctatus Fowler, Acad. Nat. Sc. Philadelphia, Monogr. 2, 1938, p. 204.

D. IX. 12. A. III. 12. P. 2. 11. V. I. 5. Ll. 29. Ltr. $\begin{array}{c}3\frac{1}{2}\\ \hline 1\\ \hline 11\end{array}$.

Height 2.7—2.8, 3.2 in length with caudal. Head 3, 3.5 in length with caudal. Height of head 1.1 in its length. Eye 7.2, 2.8—2.9 in snout and 1.8—1.9 in very convex interorbital space. Mouth moderately protractile, somewhat oblique. Maxillary reaching nearly to below anterior nostril. Lips rather thick, plated. Squamation on superior part of head beginning behind eyes; about 10 rows of small scales, imbedded in the skin, before dorsal. Breast with similar scales. Dorsal spines flexible, but pointed. Dorsal membrane thick, not incised. Dorsal slightly increasing in height posteriorly, the first spine shorter than eye, the last ray almost as long as snout. Dorsal pointed behind. First anal spine shorter than eye, third spine somewhat longer than eye. Soft anal similar to soft dorsal. Pectorals equal to head without snout. Ventrals as long as snout and eye together. Colour of preserved specimens reddish brown or violet, each scale of the body with a light ocellus, with a dark ring. Head with narrow light bands, narrowly bordered with darker: one from lower border of eye and one from anterior border of eye, running parallel and almost horizontally, meeting those of the other side in the median line. Another one from the superior border of eye, running vertically and meeting that of the other side on the top of the head. Also a band from eye to nape and several vertical ones on preopercle and shorter oblique ones on opercle. Dorsal and anal reddish, with a light terminal and a very narrow dark subterminal longitudinal band, and with rows of dark-edged ocelli, which are smaller than those of the body. Caudal reddish, with a light border and with rows of small, light ocelli. Pectorals and ventrals yellowish. Axil of pectoral dark brown. Length 259 mm.

Habitat: Java (Patjitan); Sulu Islands!; Ambon!; New Guinea (Hood Bay). — Red Sea, Zanzibar, Mauritius, Réunion, coast of British India, Japan, Riu Kiu Islands, Formosa, Philippines, Saypan, Samoa, Tubuai, Rarotonga, Society Islands, Christmas Island, Easter Island. In sea.

8. **Anampses neoguinaicus** Blkr.

Anampses (Anampses) neoguinaicus Bleeker, Arch. Neerl. Sc. Nat. XIII, 1878, p. 57.

D. IX. 12 (13). A. III. 12 (13). P. 2. 11. V. I. 5. Ll. about 28.

Height about 4 in length with caudal. Head 4.5 in length with caudal, somewhat longer than high. Eye about 4, a little less than interorbital space. Dorsal spines slender and slightly pungent, somewhat increasing in length posteriorly, the posterior ones about thrice in height of body. Soft dorsal a little higher than spinous part, pointed behind. Pectorals obtusely rounded, longer than head without snout. Ventrals very acute, the two anterior rays conspicuously longer than the others, not shorter than pectorals. Soft anal scarcely lower than soft dorsal, pointed behind. Caudal rounded. Colour of upper part of head and anterior part of body blackish brown, remaining of head and body orange. A broad subundulate orange brown band, bordered above and below by a margaritaceous line, running from eye to opercle. Median part of sides and inferior part of head with margaritaceous spots, each bordered with a violet ring. Opercular membrane brown posteriorly and with a vertical margaritaceous stripe in the middle. Scales of thorax and back each with a small margaritaceous ocellus, generally bordered with dark. Scales of rest of body each with a vertical margaritaceous stripe. Dorsal purpur-coloured, bordered with yellow and with an intramarginal brown band, anteriorly with a blackish brown blotch. The fin is covered with numerous margaritaceous small spots, each with a violet ring. Pectorals, ventrals and caudal uniform. Anal purpurescent at base, orange in the middle and bordered below by yellowish brown; basal half with a narrow longitudinal margaritaceous band. Small margaritaceous spots and stripes, bordered with violet, scattered on the fin. Length of single specimen known 140 mm (after Bleeker, not seen by me).

Habitat: New Guinea. In sea.

9. **Anampses twistii** Blkr.

Anampses Twistii Bleeker, Acta Soc. Sc. Indo-Neerl. I, 1856. Beschr. vischs. Amboina. p. 56. — Atl. Ichth. I, 1862, p. 105.
Anampses twistii Günther, Cat. Brit. Mus. IV, 1862, p. 136.
Anampses Twistii Lunel, Mem. Soc. Phys. Hist. Nat. Genève, 1881, p. 273.
? *Anampses twisti* Ogilby, Lord Howe Island Report, No. 3. 1889, p. 67.
Anampses twisti Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 333.

D. IX. 12. A. III. 12. P. 2. 11. V. I. 5. Ll. 29. Ltr. $\begin{array}{c}3-3\frac{1}{2}\\ 1\\ \hline 10\end{array}$.

Height 2.9, 3.3 in length with caudal. Head 3, 3.4 in length with caudal. Height of head 1.3 in its length. Eye 6, twice in snout and 1.4 in convex interorbital space. Mouth very small, nearly horizontal, slightly protractile. Maxillary by far not reaching to below anterior nostril. Lips rather thick, plated. Squamation beginning behind eye with about 10 rows of small scales to dorsal, imbedded in the skin. Scales between isthmus and ventrals also smaller than those of the body, partly imbedded in the skin. Dorsal spines flexible but pungent. First dorsal spine about three fourths of eye, last not quite twice eye. Soft dorsal scarcely pointed behind, somewhat higher than spinous part, the longest ray as long as snout. First anal spine small, third longest, somewhat more than eye. Soft anal similar to soft dorsal. Pectorals equal to head without snout, ventrals as long as snout and eye together, the first ray longest but not produced into a filament. Caudal slightly rounded. Least height of caudal peduncle equal to postorbital part of head. Colour of preserved specimen reddish brown: lips, sides and inferior part of head, breast and belly lighter. A deep black blotch on opercular flap, with a white spot above it (red in life). Dorsal and anal reddish brown, with a light spot or ocellus basally between each spine and ray and with similar spots scattered on the fins. Posteriorly on the soft dorsal and anal a large round black ocellus, much larger than the eye, surrounded by a light and a narrow brown ring. Caudal and ventrals light yellowish. Pectorals hyaline. Length 140 mm.

Habitat: Ambon; Banda!. — Mauritius, Lord Howe Island?, Fiji?. In sea.

16. **Cheilio** Lacepède

(Lacepède, Hist. Nat. Poissons IV, 1802, p. 432)

Elongate, somewhat compressed. Body covered with scales of moderate size. No scaly sheath on dorsal or anal. Base of caudal covered with scales, which are not larger and even somewhat smaller than those of tail and body, excepting a median pointed one. Snout long. Head pointed, almost entirely naked. Only one row of scales on preopercle and a few scales on upper part of opercle. Mouth rather wide, slightly protractile. Lips with a double inner fold, which is fringed. Teeth in a single series in both jaws. Those of the upper jaw short, conical, somewhat compressed. Two short stout and curved canines in front of upper jaw. The teeth in the lower jaw are similar, but increase in size posteriorly and are here more distant. Anteriorly in the lower jaw two small curved canines. Preopercle in the adults with radiating venules, which are more pronounced in young specimens and end into spines at the hindborder and the inferior border of the bone, which is therefore smooth in the old and denticulated in very small specimens. Dorsal consisting of IX, rarely VIII, flexible spines and 13 (14) soft rays. Anal with III spines, the third of which is the longest, and 12 rays. Pectorals short, somewhat rounded. Ventrals very short, rounded. Caudal slightly rounded. Gillmembranes free from isthmus, only anteriorly connected with each other. Lateral line continuous.

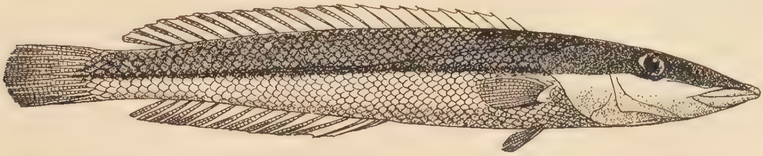

Fig. 20. *Cheilio inermis* (Forsk.). × 2/5

Distribution: that of the single species known.

1. **Cheilio inermis** (Forsk.) (Fig. 20, p. 109)

Labrus inermis Forskål, Descr. Animalium, 1775, p. 34.
Labrus inermis Bloch Schneider, Syst. Ichth. 1801, p. 262.
Labrus hassek Lacepède, Hist. Nat. Poissons III, 1802, p. 513.
Labrus auratus Lacepède, ibid. IV, 1802, p. 433.
Labrus fuscus Lacepède, loc. cit.
Cheilio auratus Quoy & Gaimard, Voyage de l'Uranie et de la Physicienne, Zool. 1824, p. 274.
Labrus fusiformis Rüppell, Neue Wirbeltiere, Fische, 1835, p. 7.
Cheilio auratus Cuvier & Valenciennes, Hist. Nat. Poissons XIII, 1839, p. 341.
Cheilio cyano-chloris Cuvier & Valenciennes, ibid. p. 346.
Cheilio fuscus Cuvier & Valenciennes, ibid. p. 349.
Cheilio Forskalii Cuvier & Valenciennes, l.c.
Cheilio hemychrysos Cuvier & Valenciennes, ibid. p. 351.
Cheilio viridis Cuvier & Valenciennes, ibid. p. 352.
Cheilio microstoma Cuvier & Valenciennes, ibid. p. 353.
Cheilio ramosus Jenyns, Zool. Voyage Beagle, 1842, p. 102.
Cheilio auratus Bleeker, Nat. Tijdschr. Ned. Indië II. 1851, p. 221.
Cheilio hemichrysos Bleeker, ibid. p. 255.
Cheilio bicolor Bianconi, Rend. Acad. d. Sc. Ist. Bologna 1856—1857, p. 100.
Cheilio inermis Bleeker, Atl. Ichth. I, 1862, p. 82.
Cheilio inermis Günther, Cat. Brit. Mus. IV, 1862, p. 194. — Fishes of Zanzibar, 1866, p. 99.

Cheilio inermis Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 530.
Cheilio inermis von Martens, Exp. nach Ost Asien. Zool. I, 1876, p. 397.
Cheilio inermis Day, Fishes of India, Part. III, 1877. p. 407.
Cheilio inermis Macleay, Proc. Linn. Soc. New S. Wales VII, 1882, p. 588.
Cheilio inermis Sauvage, Poissons de Madagascar, 1891, p. 465.
Cheilio inermis Jatzow & Lenz, Abh. Senckenb. naturf. Ges. XXI, 1899, p. 520.
Cheilio inermis Steindachner, Denkschr. Akad. Wien LXX, 1900, p. 507.
Cheilio inermis Seale, Occas. Papers B. P. Bishop Mus. I, 1901, p. 94.
Cheilio inermis Jordan & Snyder, Proc. U. S. Nat. Mus. XXIV, (1901) 1902, p. 644.
Cheilio inermis Jordan & Evermann, Bull. U. S. Nat. Mus. XXIII, (1903) 1905, p. 314.
Cheilio inermis Seale, Occas. Papers B. P. Bishop Mus. IV, 1906, p. 57.
Cheilio inermis Gilchrist & Thompson, Ann. S. Afric. Mus. VI, Part. 2, 1908, p. 199.
Cheilio inermis Günther, Fische der Südsee III, 1909, p. 283.
Cheilio inermis Jordan & Jordan, Mem. Carnegie Mus. X, 1922—1927, p. 71.
Cheilio inermis Barnard, Ann. S. Afric. Mus. XXI, 1925—1927, p. 743.
Cheilio inermis Fowler & Bean, Bull. U. S. Nat. Mus. 100, Vol. VII, 1928. p. 335.
Cheilio inermis Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 358. — ibid. XI, 1931, p. 358.
Cheilio inermis P. J. Schmidt, Bull. Acad. Sc. URSS, 1930, p. 552. — Trans. Pac. Comm. Acad. Sc. USSR. I, 1930, p. 90.
Cheilio inermis Fowler, Acad. Nat. Sc. Philadelphia, Monogr. 2, 1938, p. 239.

D. IX. 13 (14).1) A. III. 12. P. 2. 10. V. I. 5. Ll. 46—48.

Ltr. $\begin{array}{c}5\frac{1}{2}\\ \hline 1\\ \hline 13-14\end{array}$.

Height 5.5—8, 6.3—9.2 in length with caudal. Head (with opercular flap) 2.8—3, 3.2—3.3 in length with caudal. Eye 5.5—10, 2.5—4.5 in snout and 1—1.5 in almost flat interorbital space. Mouth horizontal. Maxillary reaching almost to below nostrils. About 10 scales before dorsal. First dorsal spine as long as eye, spines increasing in length posteriorly, longest almost twice as long as first, subequal to soft rays. Dorsal membranes not incised. Soft dorsal somewhat pointed behind. Anal beginning below last dorsal spine. First anal spine shortest, as long as eye, second not much shorter than third, which is almost twice as long as first. Soft anal similar to soft dorsal. Pectorals somewhat rounded, as long as postorbital part of head without opercular flap. Ventrals much shorter, about half as long as snout or somewhat longer. Caudal slightly rounded. Colour of preserved specimens brownish above, light below, the two colours sharply separated or not. A dark spot

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1) Von Martens l.c. records a specimen with D. VIII. 14.

on sides behind pectorals, or a narrow dark longitudinal band from head to caudal, consisting of a series of spots, each scale having one spot, may be present or absent. Dorsal and anal sometimes with light bands, each band with a narrow dark upper and lower border. Caudal brownish. Pectorals and ventrals hyaline. Length 400 mm.

Habitat: Sumatra (Benkulen); Java (Patjitan); Bawean; Bali; Celebes (Makassar!, Bulukomba, Badjoa, Tanawanko, Menado!); Siau!; Sangi Islands; Sulu Islands!; Saleyer!; Ternate Batjan; Ambon!; Nusa Laut!; Banda!; Buru; Ceram; Goram; Flores; Rotti!; Timor; Kei Islands!; Aru Islands; Waigeu!; North and South coast of New Guinea. — Coast of Natal, Mozambique, Madagascar, Mauritius, Réunion, Red Sea, Aden, coast of British India, China, Japan, Riu Kiu Islands, Formosa, Philippines!, coast of Queensland, Guam, Vanicolo, Aneitum, Samoa, Tahiti, Hawaii. In sea.

17. **Gomphosus** Lacepède

(Lacepède, Hist. Nat. Poissons III, 1802. p. 100)

Oblong, head pointed, snout much produced, tubiform. Body covered with large scales, which form a low basal sheath on the vertical fins. Excepting the anterior ones on the dorsal these scales are smaller than those of the body. The scales on the caudal are not larger than those of the tail. Head totally naked. Mouth somewhat protractile, tubiform, the upper jaw the longer. Teeth in jaws in a single series, rather crowded, conical and somewhat hooked. Those of anterior part of lower jaw more or less directed forwards. Two hooked canines in anterior part of upper jaw. Dorsal consisting of VIII very short pungent spines and 13 longer soft rays. Anal with II or III spines, the first in the last

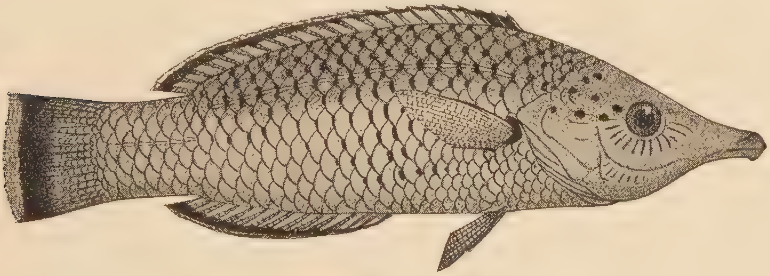

Fig. 21. *Gomphosus varius* Lac. n. s.

case minute and hidden in the skin. 10—12 anal rays. Pectorals slightly rounded behind or slightly falcate. Ventrals pointed. Caudal truncate or rounded in young, in adults in some species semilunate, the outer rays being prolonged. Gillmembranes not free, attached to isthmus. Lateral line continuous, with a sharp bent in its posterior part.

Distribution: A few species from the tropical and subtropical parts of Indic and Pacific.

Key to the Indo-australian species of Gomphosus

I. Caudal semilunate, yellow, the outer rays dark and prolonged. Body dark purple brown or blue or green. Dorsal and anal light yellowish.
  A. A yellow blotch behind head above pectorals . . 1. *G. tricolor* p. 112.
  B. No yellow blotch. Body and head uniform . . . 2. *G. coeruleus* p. 113.
II. Caudal truncate or rounded, the outer rays scarcely prolonged. Vertical fins darkish or very dark, with a white outer border. Scales of body with dark spots or stripes . . . . 3 *G. varius* p. 114.

1. **Gomphosus tricolor** Q. G.

Gomphosus tricolor Quoy & Gaimard, Voyage de l'Uranie et de la Physicienne, Zool. 1824, p. 280.

Gomphosus cepidianus Cuvier & Valenciennes, Hist. Nat. Poissons XIV, 1839, p. 18.

Gomphosus cepidianus Bleeker, Verh. Bat. Gen. XXII, (1847) 1849. Gladsch. Labr., p. 7.

Gomphosus tricolor Bleeker, Acta Soc. Sc. Indo-Neerl. I, 1856. Beschr. vischs. Manado, p. 54. — Atl. Ichth. I, 1862, p. 85.

Gomphosus tricolor Günther, Cat. Brit. Mus. IV, 1862, p. 193.

Gomphosus tricolor Day, Fishes of India. Part. III, 1877, p. 406.

Gomphosus tricolor Seale, Occas. Papers B. P. Bishop Mus. I, 1901, p. 93.

Gomphosus tricolor Jordan & Snyder, Proc. U. S. Nat. Mus. XXIV, (1901) 1902, p. 649.

Gomphosus tricolor Jordan & Evermann, Bull. U. S. Fish. Comm. XXIII, (1903) 1905, p. 290.

Gomphosus tricolor Jordan & Seale, Bull. Bur. Fish. XXV, (1905) 1906, p. 307.

Gomphosus tricolor Günther, Fische der Südsee III, 1909, p. 297.

Gomphosus tricolor Fowler & Bean, Bull. U. S. Nat. Mus. 100, Vol. VII, 1928, p. 333.

Gomphosus tricolor Fowler, Mem. B. P. Bishop Mus. X. 1928, p. 357. — ibid. XI. 5, 1931, p. 358. — Acad. Nat. Sc. Philadelphia, Monogr. 2, 1938, p. 111, p. 149.

D. VIII. 13 (14). A. III. 12 (13). P. 2. 14. V. I. 5. Ll. 28.
Ltr. $\begin{matrix}3\frac{1}{2}\\ \underline{1}\\ 10\end{matrix}$.

Height 3.8, 4.4 in length with caudal. Head 2.4, 2.8 in length with caudal. Eye 8.7, 4.7 in snout and 1.4 in somewhat convex interorbital space. Mouth not reaching half way snout. Lips thick, plated. Conical somewhat hooked teeth in a single series in both jaws. Two hooked canines anteriorly in the upper jaw. In the lower jaw the front teeth are somewhat larger and directed forwards. About 10 scales before dorsal. Dorsal spines nearly as long as diameter of eye. Soft dorsal much higher. First anal spine hidden in the skin, minute. Third anal spine slightly longer than second and somewhat more than diameter of eye. Soft anal similar to soft dorsal. Pectorals somewhat pointed, their hindborder rounded, as long as head without snout. Ventrals pointed, equal to postorbital part of head. Caudal semilunate, the lobes somewhat pointed. Colour of preserved specimen reddish brown, centre of scales of body darker. A light yellowish band, immediately behind opercle, from lateral line to below axil of pectoral. Dorsal and anal yellowish, somewhat dusky at base. Caudal yellowish, the outer rays reddish brown. Pectorals whitish hyaline, with a median greyish blue transverse band. Ventrals hyaline, the outer border somewhat dusky. Length 293 mm.

Habitat: West coast of Sumatra; Celebes (Menado); Ambon; New Guinea (Pitt Bay). — Mauritius, Ceylon, Japan, China, Riu Kiu Islands, Philippines!, Marianas, New Britain, Cook Islands, Tahiti, Paumotu Islands, Hawaii. In sea.

Note. This species is very close to *G. coeruleus,* differing chiefly in colouration. Were it not that the habitats overlap, *coeruleus* could be considered as the western and *tricolor* as the eastern geographical form of one species.

2. **Gomphosus coeruleus** Lac.

Gomphosus coeruleus Lacepède, Hist. Nat. Poissons III, 1802. p. 101.
Acarauna longirostris Sevastianof, Nov. Act. Petrop. XIII, 1803, p. 357.
Gomphosus ornatus Bennett. In Life of Raffles, 1830, p. 690.
Gomphosus viridis Bennett, Fishes of Ceylon, 1830, Pl. 30.
Gomphosus coeruleus Cuvier & Valenciennes, Hist. Nat. Poissons XIV, 1839, p. 29.
Gomphosus coeruleus Bleeker, Nat. Tijdschr. Ned. Indië IV, 1853, p. 292. — Atl. Ichth. I, 1862, p. 86.

Gomphosus caeruleus Günther, Cat. Brit. Mus. IV, 1862. p. 192. — Fishes of Zanzibar, 1866, p. 98.
Gomphosus coeruleus Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 534.
Gomphosus caeruleus Day, Fishes of India, Part. III, 1877, p. 406.
Gomphosus coeruleus Barnard, Ann. S. Afric. Mus. XXI, 1925—1927, p. 759.
Gomphosus caeruleus Fowler, Proc. Acad. Nat. Sc. Philadelphia LXXXVII (1935), 1936, p. 402.

D. VIII. 13. A. III. 11. P. 2. 13. V. I. 5. Ll. 28. Ltr. $\begin{array}{c}3\frac{1}{2}\\ 1\\ \hline 10\end{array}$.

Height 3.8—3.9, 4.5—4.7 in length with caudal. Head 2.4—2.5, 2.8—3 in length with caudal. Eye 8.7—9.4, 4.5—5.2 in snout and 1.3—1.4 in somewhat convex interorbital space. Mouth not reaching half way snout. Lips thick, plated. Conical somewhat hooked teeth in a single series in both jaws. Two hooked canines anteriorly in the upper jaw. In the lower jaw the six front teeth are somewhat larger than the others and somewhat directed forwards. 9—10 scales before dorsal. Dorsal spines shorter than eye. Soft dorsal much higher. First anal spine minute, hidden in the skin. Third spine not much longer than second, equal to eye. Soft anal similar to soft dorsal, pointed behind. Pectorals slightly falcate, as long as head without snout. Ventrals pointed, equal to postorbital part of head. Caudal semilunate, the lobes pointed. Colour of preserved specimens dark purple brown. Dorsal and anal yellow, the tip of last ray of both deep brown. Caudal yellow, but the outer rays very dark brown. Pectorals purple brown at base, deepening into dark brown distally, the outer border greyish. Another specimen is brown, each scale of body with a basal dark spot. A spot at base of dorsal, last ray of dorsal and two posterior anal rays, upper and lower lobe of caudal, axil spot of pectorals, band through that fin and tip of ventrals, black. In life these black markings were as described, but the colour of the animal was dark greenish blue, scales with a black centre, fins verditer blue.

Length 255 mm.

Nomen indig. Chaul-chaul valah (Tapah, Simalur).

Habitat: Pulu Weh!; Simalur!; Sumatra (Priaman); Celebes (Makassar!). — Coast of Natal, Zanzibar, Mauritius, Red Sea, Aden, coast of British India, Cocos-Keeling Islands, New Hebrides. In sea.

3. **Gomphosus varius** Lac.

Gomphosus varius Lacepède, Hist. Nat. Poissons III, 1802, p. 104.
?*Gomphosus pectoralis* Quoy & Gaimard, Voyage de l'Uranie et de la Physicienne. Zool. 1824, p. 282.

Gomphosus fuscus Cuvier & Valenciennes, Hist. Nat. Poissons XIV, 1839, p. 25.
Gomphosus melanotus Bleeker, Nat. Tijdschr. Ned. Indië VIII, 1855, p. 457.
Gomphosus fuscus Brevoort, U.S. Japan Exp. Nat. Hist. Washington. 1856, p. 272.
Gomphosus notostigma Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 304. — Atl. Ichth. I, 1862, p. 86.
Gomphosus melanotus Bleeker, ibid. p. 87.
Gomphosus varius Günther, Cat. Brit. Mus. IV, 1862, p. 193. — Fishes of Zanzibar, 1866, p. 99.
Gomphosus melanotus Günther, ibid. 1862, p. 194.
Gomphosus melanotus Day. Proc. Zool. Soc. London 1870, p. 698.
?*Gomphosus melanotus* Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 535.
Gomphosus pectoralis Day, Fishes of India, Part III, 1877, p. 406.
Gomphosus undulatus Streets, U. S. Nat. Mus. Bull. N° 7, 1877, p. 85.
Gomphosus varius Steindachner, Denkschr. Akad. Wien LXX, 1900, p. 507.
Gomphosus pectoralis Seale, Occas. Papers B. P. Bishop Mus. I, 1901, p. 93.
Gomphosus varius Jordan & Snyder, Proc. U. S, Nat. Mus. XXIV, (1901) 1902, p. 650.
Gomphosus varius Jenkins, Bull. U. S. Fish. Comm. XXII, (1902) 1904, p. 464.
Gomphosus varius Jordan & Evermann, ibid. XXIII, (1903) 1905, p. 289.
Gomphosus varius Jordan & Seale, Bull. Bur. Fish. XXV, (1905) 1906, p. 307.
Gomphosus varius Günther, Fische der Südsee III, 1909, p. 298.
Gomphosus pectoralis Günther, l.c.
Gomphosus varius Barnard, Ann. S. Afric. Mus. XXI, 1925—1927, p. 760.
Gomphosus varius Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 356.
Gomphosus varius Fowler & Bean. Bull. U. S. Nat. Mus. 100, Vol. VII, 1928, p. 332.
Gomphosus varius P. J. Schmidt, Trans. Pac. Comm. Ac. Sc. USSR. I, 1930, p. 91.
Gomphosus varius Fowler, Proc. Acad. Nat. Sc. Philadelphia LXXXVII, (1935) 1936, p. 403.

D. VIII. 13. A. II—III. 10—12. P. 1. 13. V. I. 5. Ll. 26—30. Ltr. $\begin{array}{c}3\\\hline 1\\\hline 10\end{array}$.[1])

Height 3.5—4.2, 4—4.8 in length with caudal. Head 2.3—2.7, 2.7—3.2 in length with caudal. Eye 6—9, according to age, 4.6—4.9 in snout in adults and 2.7—3.3 in young ones, where the snout is comparatively much shorter. Eye about equal to or somewhat less than slightly convex interorbital space. Mouth not reaching half way snout. Conical juxtaposed, more or less hooked teeth in a

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1) The basal sheath of the dorsal is formed anteriorly by one scale only, but more posteriorly this scale is replaced by 3 or more imbricate much smaller ones. In the Ltr. I have counted one scale for the sheath.

single series in the jaws. Two hooked canines anteriorly in upper jaw. Front teeth of lower jaw somewhat longer than the others and directed forwards. Eight scales before dorsal. Dorsal spines slightly increasing in length posteriorly, the first less than eye, the last about equal to eye. Soft dorsal much higher than spinous part, somewhat rounded above, the median rays being the longest, and equal to postorbital part of head (without opercular flap). Dorsal pointed behind. Anal beginning below anterior soft rays of dorsal. First anal spine minute and hidden or completely absent. Second spine not much shorter than third, which is somewhat longer than eye. Soft anal similar to soft dorsal, but not as deep. Pectorals slightly rounded behind, as long as head without snout. Ventrals pointed, about equal to postorbital part of head. Caudal rounded in young, almost truncate in adults, where only the outer rays are slightly longer. Colour of preserved specimens reddish brown or dark violet, lighter below, on throat and breast and sometimes also on belly. Scales of body with more or less distinct black spots or vertical stripes. A more or less distinct blackish band from upper part of snout through eye to hindborder of preopercle. Two rows of brown spots, bordering this band behind eye and continued to hindborder of opercle generally present. A small black blotch in axil of pectoral. Dorsal lighter or deeper brown; a large black blotch between first to fourth dorsal spines often present, specially in young specimens. A narrow marginal white band on dorsal, more developed on soft than on spinous part. Anal greyish or violet, somewhat darker at base and with a black submarginal longitudinal band, followed by a very narrow white band, more developed on tip of rays than on the membranes between them. Caudal dusky or dark brown, deepening into black distally and followed by a white marginal band, which is broadest in the middle and almost disappears on the upper and lower tip, where the rays are black from base to top. Pectorals hyaline or somewhat dusky. Ventrals hyaline, the outer border brown. Length 220 mm.

Habitat: Pulu Weh!; Sumatra (Priaman); Nias!; Java; Bali; New Guinea (Hood Bay). — Coast of Natal, Zanzibar, Madagascar, Mauritius, Réunion, Red Sea, coast of British India, Andamans, Cocos-Keeling Islands, Japan, Riu Kiu Islands, Guam, Ratuma, Samoa, Fanning Islands, Tahiti, Hawaii. In sea.

Note. The colour of the anal fin seems to vary geographically. According to the authors this fin is generally dark in specimens from the Pacific, with a row of light spots. In all specimens from the Indo-australian Archipelago seen by me, these spots are confluent into a broad light band and according to Klunzinger specimens from the Red Sea have the anal, as well as the caudal, totally of a lemon yellow colour. Fowler (1936, l.c.) describes the anal in a specimen from Natal as light olive green, with pale band of maroon at bases of rays, edges of rays darker.

18. **Thalassoma** Swainson

(Swainson, Natur. Hist. Fishes. II, 1839, pp. 172, 224)
Chlorichthys Swainson, ibid. pp. 173, 232.
Julis Bleeker, Atl. Ichth. I, 1862, p. 87 (nec Cuvier).

Oblong or elongate, snout not produced. Body covered with large scales, which form a basal sheath on the vertical fins. Scales before dorsal and on thorax smaller than those of the body. Mouth rather small, scarcely protractile. Pointed teeth in a single series in the jaws. Two canines anteriorly in each jaw. No posterior canine. Head naked or with a few scales above operculum. Dorsal consisting of VIII short pungent spines and 12—14 soft rays. Anal with III spines, the first of which may be rudimentary and hidden in the skin, and 10—13 soft rays. Pectorals triangular or slightly falcate. Ventrals more or less pointed. Caudal truncate or semilunate, sometimes with the outer lobes produced. Gillmembranes attached to isthmus. Lateral line continuous, with a sharp bent below soft dorsal.

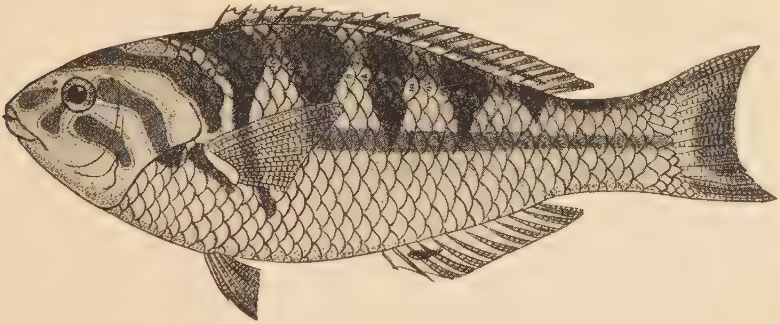

Fig. 22. *Thalassoma hardwicki* (Benn.) × 2/3

Distribution. Generally rather small fishes, but some species growing to a very large size, living on reefs and in rockpools in tropical and subtropical parts of the Atlantic, Indic and Pacific, the Red Sea and the Mediterranean.

Key to the Indo-australian species of Thalassoma

- I. A scaly patch or a few scales only on superior part of opercle.
  - A. Body with more or less conspicuous, generally broad, dark, transverse bands on the back, sometimes fusing and leaving only a few white spots between them. Generally a black blotch between anterior dorsal spines.
    - 1. Posterior bands spreading to a greater or lesser extent on anal. Sides of head without bands. In old specimens the bands fuse. Caudal semilunar, the lobes produced in adults . . . . 1. *Th. janseni* p. 119.
    - 2. Bands not continued on anal. Sides of head with longitudinal bands. Two or three ocelli on dorsal, one at the beginning, one at the end and one in the middle. Caudal truncate 2. *Th. schwanefeldi* p. 121.
    - 3. Bands not continued on anal, which often has a black blotch between the anterior soft rays. No ocelli on dorsal in adults. . . . . 3. *Th. hardwicki* p. 122.
  - B. Body with more or less conspicuous dark, longitudinal bands, with or without narrow, dark, transverse bands, which may connect the longitudinal bands and divide the light colour of the body into a longitudinal series of more or less rectangular light blotches. Generally a black spot between the anterior dorsal spines. Distal part of pectorals more or less dark.
    - 1. Head with spots and narrow stripes. Caudal truncate or slightly rounded 4. *Th. umbrostigma* p. 125.
    - 2. Colour of upper part of head light, spreading downwards anteriorly on sides of snout as a triangular prolongation, sharply defined by a narrow black line. Caudal slightly rounded, the lobes slightly produced 5. *Th. purpureum* p. 127.
    - 3. Head without stripes or bands. Light rectangular blotches on the sides, surrounded by dark lines and therefore very conspicuous. Caudal truncate, the lobes slightly produced . . . . 6. *Th. fuscum* p. 129.
    - 4. Head with longitudinal curved bands, bordered with narrow dark

lines, the lower ones of both sides connected over chin, the upper posterior ones over occiput. Caudal truncate, the lobes slightly produced 7. *Th. güntheri* p. 130.

5. Head with longitudinal curved bands, bordered with narrow dark lines. Longitudinal bands on body more developped than the transverse ones, which are narrow stripes only. Caudal truncate . . . 8. *Th. cupido* p. 132.

C. No dark longitudinal or transverse bands on body. Scales of body generally with vertical stripes. Head dark, with longitudinal bands. Pectorals light, with a more or less club-shaped dark blotch. A large dark blotch at caudal in young specimens . 9. *Th. lunare* p. 133.

II. No scales on head. No transverse bands on body. Profile of head rather convex.

A. Dark colour of back sharply defined from light underside. Tip of pectoral not black . . . . 10. *Th. amblycephalus* p. 136.

B. Dark colour of back not sharply defined from light underside. Pectoral with a terminal black blotch . . . . . 11. *Th. melanochir* p. 137.

1. **Thalassoma janseni** (Blkr.)

Julis (*Julis*) *Jansenii* Bleeker, Acta Soc. Sc. Indo-Neerl. I, 1856. Beschr. nieuwe vischs. Manado, p. 56.
Julis Janseni Bleeker, Atl. Ichth. I, 1862, p. 91.
Julis jansenii Günther, Cat. Brit. Mus. IV, 1862. p. 187. — Fische der Südsee III, 1909, p. 295.
Julis jansenii Day, Fishes of India, Part III, 1877, p. 405.
Thalassoma janseni Snyder, Proc. U. S. Nat. Mus. XLII, 1912, p. 508.
Julis (*Janseni var. b*) M. Weber, Siboga Exp. Fische, 1913, p. 378.
Thalassoma jansenii Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 352.
Thalassoma Jansenii Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 324.

D. VIII. 13. A. II—III. 11. P. 2. 13. V. I. 5. Ll. 26—27. Ltr. $\begin{array}{c} 2\frac{1}{2} \\ \hline 1 \\ \hline 9\text{—}10 \end{array}$.

Height 3.3—3.9, 4.2—4.7 in length with caudal. Head 3—3.6, 3.7—4.5 in length with caudal. Height of head 1.2 in its length. Eye 4.3—6, 1.5—2.1 in snout and 1.1—1.5 in convex interorbital space. Mouth nearly horizontal. Corner of mouth not reaching to below anterior nostril. Lips thick, plated. Teeth moderate, in a single crowded series in both jaws. Two moderate canines in upper and lower jaw. Head naked, with exception of a small patch of about 4 scales, arranged in 2 rows, immediately above opercle. About 6 scales before dorsal. Dorsal spines short and slender, the first scarcely as long as diameter of eye, the last almost half diameter of eye longer. Membranes between the spines not or scarcely incised. Soft dorsal higher than spinous part, pointed behind. Origin of anal below last dorsal spine. First anal spine minute, hidden in the skin or absent. Last anal spine longest, slightly longer than last dorsal spine. Soft anal similar to soft dorsal. Base of dorsal and anal with a low scaly sheath. Pectorals half diameter of snout shorter than head. Ventrals with the first ray more or less produced, equal to postorbital part of head. Caudal semilunar, the outer rays prolonged into long filaments in adult specimens. In preserved specimens the head is dark brown or bluish grey above, creamy white below, the demarcation between the colours rather sharp and situated in a line from posterior border of eye to opercular flap. The dark colour of the upper part of the head is continued to below second dorsal spine; the membrane between first and second dorsal spines also dark, much darker and forming a black blotch in young specimens. Inferiorly the dark colour ends on the level with that of the head, forming one large saddle over head and anterior part of body. It is however intersected by a light area, bordering the hindborder of the gill-opening. This saddle followed by five similar saddles, diminishing in breadth posteriorly, the last very faint on caudal peduncle. The interspaces smaller than the saddles and of the same creamy white colour as the underside of the body. In young specimens the saddles are continued on the basal part of the dorsal, which is otherwise creamy white with a narrow white outer border. In older specimens the dark colour spreads upwards to this border. The second to fifth saddles fuse more or less in old specimens, and descend also to the ventral side, where they spread on the anal, the posterior part of which and also the tip of the anterior part being often dark. In other specimens the anal is creamy white as in the young, with only a smaller or larger dark patch at the extremity of the fin. In still other specimens (the variety b of Bleeker) all the bands fuse, the upper part of head and body are dark, with some light spots on and below dorsal, as rests of the light interspaces. In the posterior part of the body the colour descends on the base of the anal, which fin is also dark posteriorly. Pectorals hyaline, often dusky in their anterior and superior part. Ventrals whitish. Caudal dusky, in young specimens with a dark spot in the middle of its base, spreading and less distinct in older specimens, where the outer rays are dark. Length 186 mm.

Nomen indig.: Chaul-chaul (Tapah, Simalur).

Habitat: Pulu Weh!; Simalur!; Sumatra (Benkulen); Nias!; Java (Karangbolang, Patjitan); Bali; Celebes (Makassar, Menado); Sangi Islands; Ambon; Letti; Tiur!; New Guinea. — Andamans, Riu Kiu Islands, Philippines, Engineer Islands, Solomon Islands, New Hebrides, Queensland, Lord Howe Island, Fiji. In sea.

2. **Thalassoma schwanefeldi** (Blkr.)

Julis Schwanefeldii Bleeker, Nat. Tijdschr. Ned. Indië IV, 1853, p. 288. — Atl. Ichth. I, 1862, p. 95.

Julis schwanefeldii Günther, Cat. Brit. Mus. IV, 1862, p. 191. — Fische der Südsee III, 1909, p. 296.

Thalassoma schwanefeldii Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 351.

Thalassoma schwanefeldi Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 320.

Thalassoma schwanefeldi Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 323.

D. VIII. 12 (13). A. III. 11. P. 2. 13 (14). Ll. 26—27. Ltr. $\begin{array}{c} 2\frac{1}{2} \\ \hline 1 \\ \hline 10 \end{array}$.

Height 3—3.2, 3.5—3.7 in length with caudal. Head 3.1, 3.6—3.7 in length with caudal. Height of head 1.2—1.3 in its length. Eye 4.8—5.2, 1.5—1.6 in snout and 1.2—1.3 in somewhat convex interorbital space. Mouth nearly horizontal. Corner of mouth scarcely reaching to below anterior nostril. Lips thick, plated. Teeth pointed, in a single series in both jaws, increasing in length anteriorly, the anterior ones moderate canines. Head naked, with exception of a small patch of 4 scales, arranged in 2 rows, on upper part of opercle. About 7 rows of scales before dorsal. Dorsal spines short and slender, the first slightly less, the last slightly more than diameter of eye. Soft dorsal higher than spinous part, pointed behind. Longest dorsal rays about one and a half diameter of eye. Origin of anal below last dorsal spine. First anal spine minute, third longest, half as long as diameter of eye. Soft anal pointed behind, its longest ray not much longer than third spine. Base of dorsal and anal with a low scaly sheath. Pectorals equal to head without snout. Ventrals slightly pointed, as long as postorbital part of head. Caudal truncate. Colour of preserved specimens bluish grey above, yellowish with a pinkish hue below. Six darker bands on back, reaching to middle of sides, the scales of the three posterior bands with blackish dots. The first and second bands below spinous dorsal, the last one on caudal peduncle. Sides of head light yellowish. A bluish grey band from eye to base of pectoral, a second less distinct one from snout, below eye, to lower border of operculum. A black, white-edged ocellus between anterior dorsal spines and another between anterior dorsal rays. A third ocellus may be present on last dorsal rays. Otherwise the spinous dorsal is dusky, the soft part light yellowish, with an indistinct median dusky band. Other fins light yellowish, rarely a darkish blotch between anterior anal rays. Length 85 mm.

Habitat: Sumatra (Kauer, Trussan); Java (Karangbollong); North Celebes. — Maledives, Philippines!, Pelew Islands, Solomon Islands, Samoa, Tahiti, Marcus Island, Tubuai. In sea.

Note. Günther, l.c. 1909, supposed that this species is the juvenile form of some other species. If so, it might be the young of *Th. hardwicki,* with which it is closely related. I find however one ray more in the pectoral of my specimens of *Th. hardwicki* and only once in *Th. schwanefeldi* I found 13 rays in one of the pectorals and 14 in the other. At the other hand I find sometimes 13 pectoral rays in young specimens of *Th. hardwicki.*

The Siamese fish figured by Fowler (Proc. Acad. Nat. Sc. Philadelphia LXXXVII, 1936, p. 158, fig. 125) as *Thalassoma schwanefeldi* is certainly not that species.

3. **Thalassoma hardwicki** (Benn.) (Fig. 22, p. 117)

Sparus hardwickii Bennett Select. Fish. Ceylon, 1828—1830, p. 12.
Julis dorsalis Quoy & Gaimard, Voyage Astrolabe. Zool. 1834, p. 713.
Chlorichthys Hardwickii Swainson, Nat. Hist. II, 1839, p. 232.
Julis semifasciatus Cuvier & Valenciennes, Hist. Nat. Poissons XIII, 1839, p. 448.
Julis dorsalis Cuvier & Valenciennes, ibid. p. 449.
Julis (Julis) dorsalis Bleeker, Nat. Tijdschr. Ned. Indië III, 1852. p. 564.
Julis (Julis) urostigma Bleeker, ibid. IV, 1853, p. 287.
Julis dorsalis Bleeker, Atl. Ichth. I, 1862, p. 94.
Julis dorsalis Günther, Cat. Brit. Mus. IV, 1862, p. 190. — Fishes of Zanzibar, 1866, p. 98.
Julis dorsalis Day, Fishes of India, Part III, 1877, p. 403.
Julis dorsalis Sauvage, Poissons de Madagascar. 1891, p. 524.
Thalassoma dorsale Jordan & Snyder, Proc. U. S. Nat. Mus. XXIV (1901), 1902, p. 648.
Thalassoma melanochir Fowler, Journ. Acad. Nat. Sc. Philadelphia (2) XII, 1904, p. 537 (nec Blkr.).
Thalassoma dorsale Jordan & Seale, Bull. Bur. Fish. XXVI (1906), 1907, p. 31.
Julis dorsale Günther, Fische der Südsee III, 1909, p. 295.

Thalassoma dorsale Franz, Abh. K. Bayer. Akad. Wiss. IV. Suppl. I, 1910, p. 53.
Thalassoma dorsale Snyder, Proc. U. S. Nat. Mus. XLII, 1912, p. 508.
Thalassoma dorsale Barnard, Ann. S. Afric. Mus. XXI, 1925—1927, p. 762.
Thalassoma hardwicke Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 350.
Thalassoma hardwicke Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 317.
Thalassoma hardwicki Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 320.
Thalassoma hardwicke Fowler, Acad. Nat. Sc. Philadelphia, Monogr. 2, 1938, p. 110.

D. VIII. 12—13. A. II. 10—11. P. 2. 13—14. V. I. 5. Ll. 27—28.

Ltr. $\begin{array}{c}3\\ \hline 1\\ \hline 10\end{array}$.

Height 3—3.1, 3.6—3.7 in length with caudal. Head 3, 3.5 in length with caudal. Height of head 1.3 in its length. Eye 5.4—6.7, 1.6—2 in snout and 1.2—1.3 in somewhat convex interorbital space. Mouth horizontal, protractile, its corner scarcely or not reaching to below anterior nostril. Teeth in single crowded series in both jaws, pointed, somewhat curved, the two anterior ones in the upper jaw moderate canines, the four anterior ones in the lower jaw also longer than the others. Head naked, with exception of a rounded patch of scales on upper part of operculum, consisting of 3 transverse rows, each of 1—3 scales. About 8 scales before dorsal. Dorsal spines short and slender, the first less than eye, the last about equal to eye. The membranes between the spines scarcely incised. Soft dorsal slightly rounded, much higher than spinous part, the first ray equal to snout, the last rays shorter. Origin of anal below last dorsal spine. Anal spines slender, second one longer than first and about equal to one and a half diameter of eye or somewhat longer. Soft anal similar to soft dorsal. Vertical fins with a low scaly sheath. Pectorals with the hindborder slightly emarginate, half length of snout shorter than head or somewhat shorter. Ventrals somewhat pointed, scarcely less than postorbital part of head. Caudal truncate or slightly rounded in young ones, in older ones the outer rays are produced and the fin is semilunar, with pointed lobes. Colour of preserved specimens grey, reddish olive or blue above, margaritaceous below. Head lighter or darker violet, with 5 generally lighter violet or blue broad bands, bordered by a narrow dark violet line. The two anterior ones from anterior border of eye more or less club-shaped, widening anteriorly. The first to middle of upper jaw, the second to corner of mouth. From the posterior three bands the uppermost is short, beginning in the scaly patch on operculum and continued a short way along hindborder of operculum. The two following run more or less parallel to each other backwards from behind eye to middle and lower end of opercular hindborder, where they are generally somewhat curved backwards. Seven dark violet transverse bands on back, tapering inferiorly. The first, often connected on back with the second and often broken into blotches inferiorly, to superior part of axil of pectoral, which generally has also a dark band along its base. The second from origin of dorsal, descending to sides at some distance behind axil of pectoral. The third, fourth, fifth, and sixth from base of dorsal to sides, decreasing in size posteriorly. The seventh forms a short saddle on caudal peduncle. A light reddish longitudinal band from middle of sides to middle of base of caudal. A second less distinct one parallel to it, from base of pectoral to lower caudal rays. Dorsal light reddish, with a longitudinal dark violet band, less distinct in young and here often only distinct between the three anterior spines and the last spine and anterior soft rays. Anal light yellowish, generally with a black blotch between the anterior soft rays. Pectorals dusky at tip. Ventrals light yellowish. Caudal yellowish, the rays often darker. Length: "It reaches a much greater size than any museum specimens I have seen or recorded in the literature. At Tahiti I saw numbers that were half a meter in length. In the Solomon Islands and on the coral reefs of the Celebes and Sulu Seas I have observed them equally large or even larger" (Herre l.c.).

Nomen indig.: Chaul chaul (Simalur, Tapah).

Habitat: Pulu Weh!; Sumatra (Siboga, Priaman, Ulakan, Padang, Trussan, Kauer); Simalur!; Batu Islands; Nias!; Java (Anjer, Batavia, Tjiringin, Patjitan, Prigi); Bawean; Celebes (Makassar!, Badjoa, Menado!, West of Malibagu Point); Basa Reef, Gulf of Boni; Limbe Strait; Sangi Islands, Talaut Islands, Sulu Islands; Tana Keke Islands; Gomomo Island; Doworra Island; Tukang Besi Islands!; Flores!; Ternate; Tidore; Batjan; Ambon; Banda; Goram; Letti; Kur!; Aru Islands; Waigeu!; New Guinea (Manokwari, Humboldt Bay!). — Coast of Natal, Mozambique, Zanzibar, Mauritius, Ceylon, coast of British India, Japan, China, Riu Kiu Islands, Bonin Islands, Philippines, Engineer Islands, Solomon Islands, New Ireland, New Hebrides, Lord Howe Island, coast of Queensland, Ratuma, Guam, Fiji, Samoa, Tahiti. In sea. Common on coral reefs.

4. **Thalassoma umbrostigma** (Rüpp.)

Julis umbrostygma Rüppell, Neue Wirbelthiere, Fische, 1835, p. 11.
Julis Souleyetii Valenciennes, Voyage de la Bonite. Zool. I. Part II, 1841, p. 190.
Julis (*Julis*) *Souleyetii* Bleeker, Nat. Tijdschr. Ned. Indië VIII, 1855, p. 176.
Julis umbrostigma Bleeker, Atl. Ichth. I, 1862, p. 92.
Julis umbrostigma Günther, Cat. Brit. Mus. IV, 1862, p. 185.
Julis umbrostigma Kner, Novara Exp. Fische II, 1865, p. 257.
Julis umbrostigma Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 538.
Julis purpurea Day, Fishes of India, Part III, 1877, p. 404 (partim).
Julis umbrostigma Steindachner, Denkschr. Akad. Wien LXX, 1900, p. 506.
Thalassoma umbrostigma Jordan & Evermann, Bull. U. S. Fish. Comm. XXIII, (1903) 1905, p. 300.
Julis umbrostigma Gilchrist & Thompson, Ann. S. Afric. Mus. VI, Part 2, 1908, p. 198.
Julis umbrostigma Günther, Fische der Südsee III, 1909, p. 294.
Julis umbrostigma M. Weber, Siboga Exp. Fische. 1913, p. 378.
Julis umbrostigma Pellegrin, Bull. Soc. Zool. France XXXIX, 1914, p. 228.
Thalassoma umbrostigma Jordan & Jordan, Mem. Carnegie Mus. X, 1922—1925, p. 72.
Thalassoma purpureum Barnard, Ann. S. Afric. Mus. XXI, 1925—1927, p. 761 (partim).
Thalassoma umbrostigma Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 352.
Thalassoma umbrostigma Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 325.
Thalassoma umbrostigma Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 324.

D. VIII. 13 (14). A. II—III. 11. P. 2. 14 1). V. I. 5. Ll. 27—29.

Ltr. $\begin{array}{c}2\frac{1}{2}\\ \hline 1\\ \hline 10-11\end{array}$.

Height 3.3—3.6, 4 in length with caudal. Head 3.3—3.6, 4—4.3 in length with caudal. Height of head 1.2—1.4 in its length. Eye 4.6—5.2, 1.6—2 in snout and 1.4 in convex interorbital space. Mouth slightly oblique, not reaching to below anterior nostril. Lips thick, plated, the inner plate festooned. Teeth moderate, in a single series, the two anterior ones in the upper and in the lower jaw moderate canines. Head naked, with exception of about 3 scales on upper part of opercle. Six or seven scales before dorsal. Dorsal spines short, the first as long as eye, the last as long as snout, the soft dorsal higher than the spinous part, somewhat rounded. Origin of anal below last spine of dorsal. First anal spine very small or absent; last spine longest, as long as longest dorsal spine. Soft anal somewhat less deep than soft dorsal, but similar in shape.

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1) In one specimen I find P. 2. 13.

Pectorals slightly more than head without snout. Ventrals without produced rays, pointed, equal to postorbital part of head. Caudal truncate or slightly rounded. Colour of preserved specimens light reddish brown, lighter below. Some scales of back each with a dark brown patch at base, arranged in about 5 groups, separated by vertical light stripes, which are confluent with a light broad band running from head to upper part of caudal. A similar light band lower down on side, parallel to the first and connected with it by about four broad vertical bands; the scales in the interspaces with dark stripes, forming groups. Similar spots below this band. Upper part and sides of head covered with dark brown spots and stripes, united into more or less conspicuous lines anteriorly, two of which parallel, running from middle of snout to below eye and from there in a downward curve to lower part of operculum. Dorsal and anal yellowish, sometimes with traces of a longitudinal band. A black blotch on second spine and on the membranes before and behind it. Other fins also white or yellowish, the pectorals often dusky at tip. In life the light bands and stripes are dark red and the dorsal and anal have a longitudinal red band. Length 212 mm.

Habitat: Sumatra (Benkulen); Java (Karangbollong, Patjitan); Talaut Islands!; Sulu Islands!; Ambon; Banda! — Coast of Natal, Madagascar, Mauritius, Réunion, Red Sea, coast of British India, Cocos-Keeling Islands, China, Riu Kiu Islands, Philippines, Pelew Islands, Pacific Islands eastwards to Tahiti and even to Easter Island. In sea.

Note. *Th. umbrostigma, purpureum, fuscum* and *güntheri* have been considered by several authors as colour varieties of one species. This may be true, but as I find no transitional stages in my material, I prefer to keep them apart provisionally.

Waite (Rec. Austr. Mus. V, 1904, p. 171) and McCulloch & Waite (Trans. Royal Soc. S. Austr. XL, 1916, p. 445) consider *umbrostigma* to be the young of *purpureum*. Waite came to this conclusion after the examination of a series collected on the reefs of Lord Howe Island. He describes the young, but does not say how their colour pattern changes into that of the adult, excepting that of the dorsal and anal fins. *Th. umbrostigma* reaches a length of over 200 mm and I have seen specimens of *purpureum* not longer than 170 mm. I am therefore not quite convinced that Waite is right.

5. **Thalassoma purpureum** (Forsk.)

Scarus purpureus Forskål. Descr. Animalium, 1775, p. 27.
Julis quadricolor Lesson, Voyage Coquille. Zool. II, 1830, p. 139.
Julis semicoeruleus Rüppell, Neue Wirbelthiere, Fische, 1835, p. 10.
Julis cyanogaster Cuvier & Valenciennes, Hist. Nat. Poissons XIII, 1839, p. 444.
Julis quadricolor Bleeker, Atl. Ichth. I, 1862, p. 93 (partim).
Julis trilobata var β. Günther, Cat. Brit. Mus. IV, 1862, p. 188.
Julis purpurea Day, Fishes of India, Part III, 1877, p. 404 (partim).
Julis purpureus Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 537.
Julis purpurea Day, Fishes of India, Part III, 1877. p. 404 (partim).
Julis purpurea Pellegrin, Bull. Mus. Hist. Nat. IV, 1898, p. 228.
Thalassoma immanis Fowler, Proc. Acad. Nat. Sc. Philadelphia, 1899, p. 488.
Thalassoma purpurea Fowler, ibid. 1900, p. 510.
Thalassoma berendti Seale, Occas. Papers B. P. Bishop Mus. I, 1901, p. 15.
Julis purpurea Seale, ibid. p. 91.
Thalassoma purpureum Jenkins, Bull. U. S. Fish Comm. XXII, (1902) 1904, p. 462.
Thalassoma purpureum Jordan & Evermann, ibid. XXIII, (1903), 1905, p. 295.
Thalassoma purpureum Jordan & Seale, Bull. Bur. Fish. XXV, (1905) 1906, p. 305.
Julis purpurea Günther, Fische der Südsee III, 1909, p. 292.
Julis purpurea M. Weber, Siboga Exp. Fische, 1913, p. 379 (partim).
Thalassoma purpureum McCulloch & Waite, Trans. Royal Soc. S. Austr. XL, 1916, p. 445 (sine syn.).
Thalassoma purpureum Jordan & Jordan, Mem. Carnegie Mus. X, 1922—1925, p. 72.
Thalassoma purpureum Barnard, Ann. S. Afric. Mus. XXI, 1925—1927, p. 761 (partim).
Thalassoma purpureum Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 353.
Thalassoma purpureum Pietschmann, Bull. B. P. Bishop Mus. No. 73, 1930, p. 18.
Thalassoma quadricolor Whitley, Austral. Zool. VIII, Prt. 4, 1937, p. 225.
Thalassoma purpureum Fowler, Acad. Nat. Sc. Philadelphia, 1938, p. 111.

D. VIII. 13. A. II—III. 11. P. 2. 14. V. I. 5. Ll. 27—30. Ltr. $\begin{array}{c} 2\frac{1}{2} \\ \hline 1 \\ \hline 10-11 \end{array}$.

Height 3—3.1, 3.7—3.9 in length with caudal. Head 2.8—3, 3.5—3.7 in length with caudal. Height of head 1.2—1.3 in its length. Eye 6.1—7, 2.2—2.5 in snout and 1.4—1.5 in convex interorbital space. Mouth slightly oblique, almost reaching to below anterior nostril. Lips thick, plated, the inner plate papillated. Teeth in a single series, the two anterior ones in upper and lower jaw strong curved canines. Head naked, with exception of 3 or 4 scales in two rows on upper part of operculum. About 8 scales before dorsal. Dorsal spines short and slender, the first as long as eye, the last half diameter of eye longer. Soft dorsal higher than spinous part, somewhat pointed behind. Origin of anal below first soft ray of dorsal. First anal spine minute or wanting, last longest,. scarcely longer than last dorsal spine. Soft anal similar to soft dorsal. Pectorals as long as head without snout or slightly shorter. No produced ventral rays. Ventrals slightly pointed, as long as snout. Caudal slightly rounded, but the lobes slightly produced. Colour of preserved specimens livid (in life green above, blue below). A broad leaden coloured or brown band, formed by the dark basal halfs of the scales, from nape to base of upper caudal rays, separated by a narrow light area from base of dorsal. Two less broad light pink longitudinal bands (red in life), the first from opercular flap to base of median caudal rays, the second from hindborder of suboperculum, below base of pectorals to base of lower caudal rays. These bands connected on the sides by bands of the same colour, formed by elongate stripes along the base of the scales. Head more or less purple. Upper part of head light bluish pink (red in life), this colour sharply defined everywhere by a narrow dark line. It spreads anteriorly on sides of snout downwards as a triangular prolongation, the line bordering it descending in a vertical direction from before eye to some distance above corner of mouth, here sharply bent upwards, forming the top of the triangle and running parallel to the upper lip, in an oblique direction upwards and forwards, meeting that of the other side on the top of the snout. A similar prolongation of the colour of the upper part of the head, but somewhat lighter and more pinkish, running as a broad band from behind eye obliquely downwards to suboperculum, bifurcating before it reaches its hindborder, where the two branches end. Operculum bordered above with a light pinkish band. A similar band along base of pectoral, joining below the lower longitudinal band on body. Dorsal yellowish above, pinkish below, the two colours separated by a narrow black line. Caudal yellowish; the bands of the body continued on it as purple narrower bands. Similar bands along the upper and lower rays, excepting the outermost above and below, which are again yellowish. Pectorals dusky along their upper border and at tip. Ventrals pinkish. In a small specimen the scales between the two light bands on the sides are partly dark at base, as those of the back, forming about 5 groups along the sides. About 3 or 4 similar groups below the second band, above anal. This specimen has also some dark spots on the nape. Length 431 mm.

Nomen indig.: Chaul chaul salah (Simalur).

Habitat: Simalur!; Java (Patjitan); Karkaralong Islands!. — Coast of Natal, Madagascar, Mozambique, Zanzibar, Red Sea, Sokotra, coast of British India, Pacific Islands eastwards to Hawaii, Tahiti, Paumotu Islands and even to Easter Island. In sea.

Note. See note at *Th. umbrostigma.*

6. **Thalassoma fuscum** (Lac.)

Labrus fuscus Lacepède, Hist. Nat. Poissons III, 1802, p. 437, p. 493.
Labrus trilobatus Lacepède, ibid. p. 454, p. 526.
Julis bicantenatus Bennett, Proc. Comm. Zool. Soc. I, 1831, p. 167.
Julis trilobatus Cuvier & Valenciennes, Hist. Nat. Poissons XIII, 1839, p. 437.
Julis formosus Cuvier & Valenciennes, ibid. p. 439.
Julis quadricolor Bleeker, Atl. Ichth. I, 1862, p. 93 (partim). Tab. 34, fig. 3.
Julis trilobata var. α Günther, Cat. Brit. Mus. IV, 1862, p. 187.
Thalassoma fuscum Jordan & Evermann, Bull. U. S. Fish. Comm. XXIII, (1903), 1905, p. 299.
Thalassoma fuscum Jordan & Seale, Bull. Bur. Fish. XXV, (1905) 1906, p. 306.
?*Julis trilobata* Gilchrist & Thompson, Ann. S. Afric. Mus. VI, Prt 2, 1908, p. 199.
Julis fusca Günther, Fische der Südsee III, 1909, p. 293.
Julis purpurea M. Weber, Siboga Exp. Fische, 1913, p. 379 (partim).
Thalassoma fuscum Jordan & Jordan, Mem. Carnegie Mus. X, 1922—1925, p. 72.
Thalassoma trilobata Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 353. — ibid. XI, 5, 1931, p. 356.
Thalassoma fuscum P. J. Schmidt, Trans. Pac. Comm. Acad. Sc. USSR. I, 1930, p. 89.

D. VIII. 13. A. III. 11. P. 2. 14. V. I. 5. Ll. 27. Ltr. $\begin{array}{c}2\frac{1}{2}\\ \hline 1\\ \hline 10\end{array}$.

Height 3.3, 4 in length with caudal. Head 3.4, 4.1 in length with caudal. Height of head 1.1 in its length. Eye 5.6, 1.8 in snout and 1.4 in convex interorbital space. Mouth slightly oblique, not reaching to below anterior nostril. Lips thick, plated, at least the upper one. Teeth in a single series, the two anterior ones in both jaws moderate canines. Head naked, with exception of 3 small scales on upper part of opercle. About 9 scales in front of dorsal. Dorsal spines short and slender. First spine somewhat more than eye, last one twice diameter of eye. Soft dorsal higher than spinous part, somewhat pointed behind. Origin of anal below first soft ray of dorsal. First anal spine minute, last longest, about as long as longest dorsal spine. Soft anal similar to soft dorsal. Pectorals half length of snout shorter than head. Ventrals without produced rays, moderately pointed, as long as postorbital part of head. Caudal truncate, but the lobes slightly produced. Colour of preserved specimen purplish violet above, lighter below. Two longitudinal series of large rectangular blotches, one from upper part of opercle to base of upper caudal rays, the second from opercular flap, above pectorals, to sub median caudal rays. These blotches are bordered by a narrow dark line, followed by a light bluish area, the interspaces between the blotches of the same bluish colour. The blotches are of a brownish colour. Head purple, lighter below, darker on anterior part of preopercle and towards posterior part of opercle, which has a light hindborder. Dorsal with a dusky median band, darkened to a blackish patch between the first to third spines. Anal yellowish red distally, light violet basally, the two colours separated by a narrow longitudinal dark stripe. Caudal yellowish, with indistinct brownish purple longitudinal bands. Pectorals with a dark blue axil spot, brownish along their upper and distal part, the rest of the fin yellowish. Ventrals yellowish. Length 240 mm.

Habitat: Java (Patjitan); Talaut Islands!. — Coast of Natal, Madagascar, Zanzibar, Mauritius, Réunion, Seychelles, coast of British India, China, Riu Kiu Islands, New Hanover, Ongtong Java, Solomon Islands, New Hebrides, Lord Howe Island, Samoa, Laysan, Hawaii!; Tahiti, Rarotonga, Tubuai. In sea.

Note. See at *Th. umbrostigma.*

7. **Thalassoma güntheri** (Blkr.)

?*Scarus quinquevittatus* Lay & Bennett, Zool. Beechey's Voyage, 1839, p. 66.
Julis (*Julis*) *quadricolor* Bleeker, Acta Soc. Sc. Indo-Neerl. I, 1856. Beschr. vischf. Manado, p. 55 (nec Less.).
Julis Güntheri Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 279. — Atl. Ichth. I, 1862, p. 94.
Julis güntheri Günther, Cat. Brit. Mus. IV, 1862, p. 189.
Julis Rüppellii Klunzinger, Verh. zool. bot. Ges. Wien, XXI, 1871, p. 536.
Thalassoma guntheri Jordan & Seale, Bull. Bur. Fish. XXV, (1905) 1906, p. 305.
Julis güntheri Günther, Fische der Südsee III, 1909, p. 294.
Thalassoma guntheri Snyder, Proc. U. S. Nat. Mus. XLII, 1912, p. 508.
Julis Güntheri M. Weber, Siboga Exp. Fische, 1913, p. 379.
Thalassoma purpureum Barnard, Ann. S. Afric. Mus. XXI, 1925—1927, p. 761 (partim).
Thalassoma quinquevittatus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 316.
Thalassoma quinquevittatus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 350.
Thalassoma quinquevittatus Fowler, Acad. Nat. Sc. Philadelphia, Monogr. 2, 1938, p. 110.

D. VIII. 13. A. III. 11 (12). P. 2. 14. V. I. 5. Ll. 28—29. Ltr. $\frac{2\frac{1}{2}}{\frac{1}{10}}$.

Height 3.4—3.9, 4—4.5 in length with caudal. Head 3.1—3.9, 3.7—4.2 in length with caudal. Height of head 1.2—1.4 in its length. Eye 4.4—5.3, 1.4—1.7 in snout and 1.1—1.4 in somewhat convex interorbital space. Mouth somewhat oblique, not reaching to below anterior nostril. Teeth in a single series, the two anterior ones in the upper and lower jaw moderate canines, but the latter not much longer than the following teeth. Lips rather thick, plated, the inner plate festooned. Head naked, with exception of a rounded patch of about 5 scales on upper part of operculum. Seven or eight scales in front of dorsal. Dorsal spines short, slender; the first a little less, the last a little more than diameter of eye. Soft dorsal much higher than spinous part, the longest ray as long as snout, the fin slightly rounded behind. Origin of anal below first soft dorsal ray. First anal spine minute, third longest, as long as longest dorsal spine. Soft anal similar to soft dorsal. Pectorals half length of snout shorter than head. Ventrals without produced rays, somewhat pointed, equal to postorbital part of head. Caudal truncate, but the outer rays somewhat produced. Colour of preserved specimens brownish violet, lighter below. A bluish light band, bordered by a narrow dark line, from snout to eye. A similar band from chin, where it is confluent with that of the other side, to below eye, narrowing here and continued as a broad curved band to opercle, above branchial opening. A similar curved band, above and parallel to the first, from hindborder of eye to axil of pectoral, which is black. This band connected with that of the other side by a band, running over occiput. A band connecting frontborders of eyes and running forwards over snout is more or less distinct. A lateral bluish or light violet band on the body from nape, where it generally meets that of the other side, running at some distance below dorsal to upper caudal rays. A second band from above pectorals to middle caudal rays. The two bands connected more or less by one or two vertical narrow bands above pectoral. An oblique band from gill opening, below pectoral, running in the direction of the anal, but generally not reaching so far. In its anterior course it is sometimes accompanied by another band, running below it. Dorsal white basally, reddish distally. A black spot between the first to third spines. Anal hyaline. Caudal yellowish, the upper and lower rays light violet, bordered by a narrow dark line. Base of caudal dark brown, this colour sometimes spreading on caudal peduncle and forming a dark blotch. Pectorals yellowish, black at tip. Ventrals yellowish. Length 140 mm.

Habitat: Celebes (Menado); Sangi Islands; Talaut Islands!; New Guinea. — Cape of Good Hope, Red Sea, coast of British

India, Riu Kiu Islands, Philippines, Engineer Islands, Solomon Islands, New Hebrides, Marshall Islands, Loyalty Islands, Samoa, Fanning Islands, Laysan. In sea.

Note. See note at *Th. umbrostigma.*

8. **Thalassoma cupido** (Schl.)

Julis cupido Schlegel, Fauna Japonica, Poissons, 1846, p. 170.
Julis cupido Bleeker, Verh. Bat. Gen. XXII, (1847) 1849. Gladsch. Labr., p. 30. — Atl. Ichth. I, 1862, p. 93.
Julis cupido Günther, Cat. Brit. Mus. IV, 1862, p. 181.
Julis cupido Steindachner & Döderlein, Denkschr. Akad. Wien, LIII, 1887, p. 276.
Thalassoma cupido Jordan & Snyder, Proc. U. S. Nat. Mus. XXIV, (1901) 1902, p. 646.

D. VIII. 13. A. III. 11. P. 2. 13. Ll. 28. Ltr. $\begin{array}{c}2\\\hline 1\\\hline 9\text{—}10\end{array}$.

Height 3, 3.9 in length with caudal. Head 2.9, 3.8 in length with caudal. Height of head 1.3 in its length. Eye 5.8, 1.8 in snout and 1.3 in rather convex interorbital space. Head naked, with exception of a few imbricate scales superiorly on opercle. Teeth pointed, increasing in size anteriorly, the anterior ones canines. Mouth horizontal. Corner of mouth below anterior nostril. First dorsal spine equal to eye, last dorsal spine as long as snout, the longest dorsal ray half diameter of eye longer. Membranes between the dorsal spines and rays incised. First anal spine minute, third longest, slightly less than snout. Soft anal similar to soft dorsal. Pectorals equal to head without snout. Ventrals as long as eye and snout together. Caudal truncate or slightly rounded. Colour of preserved specimen brownish, head darker. A light dark-edged band from upper lip to inferior border of eye, continued with a slight downward bent to hindborder of opercle. A second band below it, from corner of mouth to posterior part of operculum. A dusky longitudinal median band from head to caudal. A similar somewhat narrower one along base of dorsal. Numerous narrow vertical stripes along back and upper part of sides. Dorsal hyaline with a black median stripe between the first and second spines, widening into a blotch between the second and third spines. Basal part of anal dark. Distal half of pectorals with a large dark blotch, leaving only the upper and lower border of the fin light. A small black blotch at pectoral axil. Caudal light (Description made after a javanese specimen of Bleeker's collection in the Leiden Museum). Length 200 mm.

Habitat: Java (Pagotang, Patjitan, Karangbollong). — Japan. In sea.

Note. Bleeker already was struck by the curious discontinuous distribution of this species, which is only known from the southcoast of Java and from the coast of Japan. The habitat "Batavia" given by Günther is a mistake. Since Bleeker's time the species has not been recorded again from Java or other places in the Indo-australian Archipelago, but only from Japan. I have examined the specimens from Java in Bleeker's collection. They differ from typical *Th. cupido* from Japan in lacking the dark base to the dorsal fin and the dark patch on the caudal, as has already been remarked by Bleeker. The bands on the head are more pronounced than in specimens from Japan, but as the colour and markings of preserved specimens seem to be widely different from those of fresh ones in this species, it is difficult to say if the differences noted are due to preservation. I am not quite convinced, that the javanese *cupido* is the same as the japanese, and this question can only be solved with a larger material than now available. The javanese *cupido* shows affinity to *güntheri* and its allies.

9. **Thalassoma lunare** (L.)

Labrus lunaris Linné. Syst. Nat. ed. 10, 1758, p. 283.
Scarus gallus Forskål, Descr. Animalium, 1775, p. 26.
Julis porphyrocephalus Bennett, Proc. Comm. Zool. Soc. London II, 1832, p. 183.
Julis lunaris Rüppell, Neue Wirbelthiere, Fische, 1835, p. 11.
Julis lunaris Cuvier & Valenciennes, Hist. Nat. Poissons XIII, 1839, p. 409.
Julis meniscus Cuvier & Valenciennes, ibid. p. 415.
Julis lunaris Bleeker, Verh. Bat. Gen. XXII, 1849. Gladsch. Labr. p. 28.
Julis (Julis) celebicus Bleeker, Nat. Tijdschr. Ned. Indië IX, 1855, p. 313.
Julis lunaris Bleeker. Atl. Ichth. I, 1862, p. 90.
Julis lunaris Günther, Cat. Brit. Mus. IV, 1862, p. 181.
Julis gracilis Steindachner, Verh. zool. bot. Ges. Wien, XIII, 1863, p 1190.
Julis lunaris Kner, Novara Exp. Fische, I, 1865, p. 256.
Julis lunaris Steindachner, Sitzber. Akad. Wiss. Wien, LIII, 1866, p. 463.
Julis lunaris Klunzinger, Verh. zool. bot. Ges. Wien, XXI, 1871, p. 535.
Julis lunaris Day, Fishes of India. Part III, 1877, p. 403.
Thalassoma lunare Fowler, Journ. Acad. Nat. Sc. Philadelphia (2) XII, 1904, p. 537.
Thalassoma lunare Jordan & Seale, Bull. Bur. Fish. XXV, (1905) 1906, p. 305.
Thalassoma lunaris Evermann & Seale, ibid. XXVI, (1906) 1907, p. 94.
Julis lunaris Gilchrist & Thompson, Ann. S. Afric. Mus. VI, Part 2, 1908, p. 198.
Julis lunaris Günther, Fische der Südsee III, 1909, p. 289.

Thalassoma lunare Kendall & Goldsborough, Mem. Mus. Comp. Zool. Harvard Coll. XXVI, N° 7, 1911. p. 302.
Thalassoma lunare Barnard, Ann. S. Afric. Mus. XXI, 1925—1927, p. 763.
Julis lunaris Vinciguerra, Ann. Mus. Civ. Genova (3) X, 1926, p. 563.
Thalassoma lunaris Marshall, Mem. Queensl. Mus. IX, Part II, 1928, p. 191.
Julis lunaris Ahl, Blätter f. Aquarien- und Terrarienkunde XXXIX, 1928, Heft 3.
Thalassoma lunare Fowler & Bean, Bull. U. S. Nat. Mus. 100, Vol. VII, 1928, p. 321.
Thalassoma lunare Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 351.
Thalassoma lunare P. J. Schmidt, Trans. Pac. Comm. Acad. Sc. USSR. I, 1930, p. 89.
Thalassoma sp. Giltay, Mem. Mus. Royal Hist. Nat. Bruxelles V, Fasc. 3, 1933, p. 78 (juv.).
Thalassoma lunare Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 321.

D. VIII. 13. A. III. 11. P. 2. 13. V. I. 5. Ll. 28—29. Ltr. $\begin{array}{c}3\\ \hline 1\\ \hline 11\end{array}$.

Height 3.1—3.6, 4.4—4.5 in length with caudal. Head 3.4—3.6, 4.2—4.5 in length with caudal. Height of head 1.3 in its length. Eye 5.8—6, more than twice in snout and 1.5 in convex interorbital space. Mouth slightly ascending, protractile, small, not reaching to vertical through anterior nostril. Lips rather thick, plated, the most interior plate festooned. Teeth in a single series in both jaws, those of the upper jaw curved, the two anterior ones canines. In the lower jaw the teeth gradually increase in size anteriorly, the two anterior ones moderate canines. Head naked, with exception of a few small scales in the supraopercular region. Seven or eight scales before dorsal. Dorsal spines slender, stiff; the first equal to diameter of eye, the last one less than diameter of pupil longer. Membranes between the spines scarcely incised. Soft dorsal slightly higher than spinous part, pointed behind. Origin of anal below last dorsal spine. First anal spine minute, third slightly longer than second spine, which is as long as diameter of eye. Soft anal similar to soft dorsal. Vertical fins with a low scaly sheath. Pectorals with the top rounded, the hindmargin nearly straight, slightly more than head without snout. Ventrals with the first ray prolonged, shorter than pectorals. Caudal semilunar, the outer rays much longer than the middle ones and prolonged into a filament in large specimens. Colour of preserved specimens greyish green or reddish, according to preservation. Scales of body with or without dark, narrow vertical stripes. Head dark brown, chin light, crossed by a dark band. Light narrow oblique bands on operculum and two more or less conspicuous broad light longitudinal bands on lower part of head, continued on body; the superior one to below base of pectoral, the other to above origin of anal. A light, large, blackish blotch at base of caudal, disappearing with age. Dorsal white, with a longitudinal median black or grey band, broader posteriorly, where the whole basal part of the soft dorsal is of that colour. In young specimens sometimes a black blotch, which may be encircled by white, and forming an ocellus, on the membranes between the anterior soft rays. Anal dark brown basally as the soft dorsal, white distally. Outer rays of caudal dark brown to a greater or lesser extent, the colour fusing with the dark blotch on caudal. Pectorals white, with a dark longitudinal band, covering the three anterior divided rays, rounded distally and more or less club-shaped. A black spot at base of undivided rays. Ventrals whitish. In fresh state the colour of the body is blue or green, the head much darker, the markings on body and head are red, as well as the bands on the fins, which are lined with blue. Length 300 mm.

Nomen indig.: Nila-nila (Batavia). Mandela (Javan.). Udu (Lampong). Beru-beru (Ternate). Lamoru (Ambon).

Habitat: Singapore!; Bintang; Sumatra (Tapanuli, Siboga, Priaman, Ulakan, Trussan, Padang, Telokbetong); Nias!; Biliton; Java (Batavia!, Karangbollong, Patjitan, Prigi); Madura!; Bawean; Borneo (Balikpapan!, Sandakan, Sarawak); Danawan Island; Si Amil Island; Postillion Islands!; Celebes (Makassar, Tombariri, Bulukomba, Kema, Menado); Limbe Strait; Sangi Islands; Sulu Islands!; Flores!; Solor!; Timor!; Halmahera; Batjan; Ternate; Buru; Ceram; Ambon!; Nusa Laut!; Banda!; Aru Islands!; New Guinea (Manokwari, Port Moresby); Mysore. — Natal!, coast of Zululand, Delagoa Bay, Mozambique, Madagascar, Zanzibar, Red Sea, Aden, coast of British India, Ceylon, Siam, Indo-China, China!, Riu Kiu Islands, Philippines!, Australia, Solomon Islands, Lord Howe Island, New Hebrides, Marcus Island, Marshall Islands, Gilbert Islands, Tonga Islands, Funafuti, Tahiti. In sea.

Note. *Julis gracilis* Steindachner is without doubt based on a young specimen of this species, in which Steindachner overlooked the dark band on the pectoral, which may be very well possible, as this band fades considerably in preserved specimens. The specimens described by Giltay l.c., which the author kindly sent me for examination, are also young of this species.

10. **Thalassoma amblycephalus** (Blkr.)

Julis amblycephalus Bleeker, Nat. Tijdschr. Ned. Indië XI, 1856, p. 83. — Atl. Ichth. I, 1862, p. 90.

Julis amblycephalus Günther, Cat. Brit. Mus. IV, 1862, p. 182. — Fische der Südsee III, 1909, p. 296.

Julis amblycephalus Day, Fishes of India, Part III, 1877, p. 404.

Thalassoma amblycephalus Fowler & Bean, Bull. U. S. Nat. Mus. 100, Vol. VII, 1928, p. 330.

Thalassoma amblycephalus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 356.

Thalassoma amblycephalus P. J. Schmidt, Trans. Pac. Comm. Acad. Sc. USSR. I, 1930, p. 89.

D. VIII. 13. A. III. 10 (11). P. 2. 13. V. I. 5. Ll. 26—27.

Ltr. $\begin{array}{c} 2\frac{1}{2}-3 \\ \hline 1 \\ \hline 11 \end{array}$.

Height 4.2, 5.3 in length with caudal. Head 3.3, 4.2 in length with caudal. Eye 3.8, 1.2 in snout and slightly less than convex interorbital space. Mouth small, nearly horizontal. Corner of mouth reaching to below anterior nostril. Teeth pointed, in a single row. Upper jaw with 2 curved canines anteriorly. In the lower jaw the teeth increase in size towards the symphysis, the four anterior ones moderate canines. About 6 scales before dorsal. Dorsal spines short; the first somewhat less, the last somewhat more than eye. Soft dorsal higher than spinous part, the longest ray about twice eye. Spines and rays somewhat produced beyond the fin membrane. Origin of anal below anterior dorsal rays. The first anal spine very small, the third longest, as long as last dorsal spine. Soft anal slightly less deep than soft dorsal. Pectorals half length of snout shorter than head. Ventrals with the first ray slightly produced, equal to snout and eye together. Caudal truncate, the outer rays somewhat produced. Colour of preserved specimen dark brown above, light below, the two colours sharply separated. Upper parts still darker at the boundary line, forming a more or less distinct dark longitudinal band from snout to middle caudal rays. Each scale of body with an indication of a light transverse stripe. Spinous dorsal brownish, soft dorsal lighter, with cloudy darker markings. Anal yellowish. Caudal yellowish, the lobes somewhat darker. Ventrals and pectorals yellowish, the latter with a triangular black blotch anteriorly at base. Length 100 mm.

Habitat: Java (Malang australis); Celebes (Menado, Tanawanko); Sangi Islands; Ceram; Ambon. — Ceylon, Riu Kiu Islands, Philippines, Ponapé, Huahine, Mortlock Islands, Carolines, New Caledonia, Rotuma, Society Islands. In sea.

Note. Very close to *Th. melanochir*; perhaps they represent the two sexes of one species. I do not see any trace of bands on the head in a specimen from the Philippines, the only one seen by me. Bleeker thought that *amblycephalus* had only one band on the head, but Günther describes and figures a specimen of this species with two bands, exactly as in *Th. melanochir*.

11. **Thalassoma melanochir** (Blkr.)

Julis melanochir Bleeker, Acta Soc. Sc. Indo-Neerl. II, 1857. Achtste bijdr. vischf. Amboina, p. 77 — Atl. Ichth. I, 1862, p. 89.
Julis melanochir Günther, Cat. Brit. Mus. IV, 1862, p. 182. — Fische der Südsee III, 1909, p. 296.
Julis melanochir Steindachner, Sitzber. Akad. Wien LXXII, 1875, p. 91.
Thalassoma steindachneri Jordan, Rep. Comm. Fish. U.S.A., (1887) 1891, p. 654.
Chlorichthys steindachneri Jordan & Evermann, Fishes of North and Middle America, Part II, 1898, p. 1609.
Thalassoma melanochir Fowler & Bean, Bull. U. S. Nat. Mus. 100, Vol. VII, 1928, p. 328.

D. VIII. 13 (14). A. III. 11. P. 1. 13. V. I. 5. Ll. 27. Ltr. $\frac{\frac{2\frac{1}{2}-3}{1}}{10}$.

Height 3.6—4, 4.5—5.1 in length with caudal. Head 3.8, 4.8—5 in length with caudal. Eye 4.8—5.3, 1.3—1.5 in snout and 1.3—1.5 in convex interorbital space. Mouth small, nearly horizontal. Corner of mouth reaching to below anterior nostril. Teeth pointed, somewhat curved, in a single row crowded in the upper jaw, anteriorly with two canines. In the lower jaw the teeth increase in size near symphysis, the four anterior ones and specially the two nearest to symphysis are canines. Head entirely naked. Seven or eight scales before dorsal. Dorsal spines short and slender, the first about equal to eye, the last somewhat more than eye. Soft dorsal higher than spinous part, the longest ray nearly equal to twice diameter of eye. Spines and rays slightly projecting from the membranes. Origin of anal about below beginning of soft dorsal. First anal spine minute, third longest, as long as longest dorsal spine. Soft anal similar to soft dorsal. Pectorals somewhat pointed, the tip rounded, the hindborder nearly straight, half length of snout shorter than head. Ventrals with the first ray slightly produced, equal to snout and eye together. Caudal semilunar, the outer rays much produced. Dorsal with a low scaly sheath. Colour of preserved specimens violet or reddish above, light below. Head violet, leaden coloured on sides, with two longitudinal bluish bands, narrowly bordered by blackish. The superior one from hindborder of eye to half way operculum, the second one from corner of mouth to edge of preopercle. Dorsal with a submarginal dark brown narrow band; the membranes between the anterior spines also dark brown. Base and tip of pectorals dark brown. Anal whitish. Caudal yellowish, the outer rays violet, darker towards the produced tips, which are bordered by white. Length 160 mm.

Habitat: Talaut Islands!; Limbe Strait; Ambon; Aru Islands!; New Guinea (Manokwari). — China, Annam, Indo-China, Philippines, Malapacua Island, Nauru, Marshall Islands, Samoa, Fanning Islands, Society Islands, Hawaii, Pacific coast of Mexico. In sea.

Note. Steindachner l.c. described a specimen as *melanochir* from Acapulco, Pacific coast of Mexico, which differs only slightly in colour from typical ones. It is somewhat more slender, and the caudal is dark, bordered with white. I do not think these characteristics sufficient to separate it from *melanochir,* as has been done by Jordan l.c., chiefly on account of its provenience, although it is rare that species of marine fish from the Western Pacific spread as far East as the American coast.

Doubtful species

1. **Thalassoma genivittatus** (C. V.)

Jordan & Seale (Bull. Bur. Fish. XXV, (1905) 1906, p. 307) give as habitat of this species: "Marcus Island, East Indies". The first mentioned locality is based on a record from Bryan & Herre (Occas. Papers B. P. Bishop Mus. II, 1903, p. 131) and according to Fowler (Mem. B. P. Bishop Mus. X, 1928, p. 354) their specimen was not of this species but belongs to *Th. lutescens.* I find no record from the East Indies. Cuvier & Valenciennes described *genivittatus* from Mauritius. Bleeker ranges it as a doubtful synonym of *melanochir.* Günther, who records a specimen from the Red Sea and specimens from Port Natal, united it with *hebraicum* (Cat. Brit. Mus. IV, 1862, p. 508). This last species is only known from the western part of the Indic. Although Day (Fishes of India, Part III, 1877, p. 404) gives as habitat: "Red Sea, east coast of Africa, seas of India and beyond" I know of no record as far East as the Indo-australian Archipelago. Fowler, it is true, has mentioned this species from the Sandwich Islands (Proc. Acad. Nat. Sc. Philadelphia, 1900, p. 510) but corrected his former identification (Mem. B. P. Bishop Mus.

X, 1928, p. 355) and now considers his specimen to belong to *Th. duperreyi* (Q. G.), which is a species belonging to the fauna of the Pacific Islands.

19. **Duymaeria** Bleeker

(Bleeker, Acta Soc. Sc. Indo-Neerl. I, 1856. Beschr. Vischs. Amboina, p. 52)
Labrastrum Guichenot, Revue et Magazin de Zool. (2) XII, 1860, p. 152.

Body oblong, compressed, covered with large scales, which form a sheath on base of dorsal and anal. Base of caudal covered with a few very large deciduous scales. Lateral line continuous, with a sharp bent in its posterior part. Head naked, with exception of the opercular series of bones, which are covered by large deciduous scales. Preopercle denticulated behind. Mouth rather large. Lips rather thick, plated. A single series of conical teeth in both jaws, one or two of the posterior ones in the upper jaw enlarged and canine-like. Near the symphysis the teeth are arranged in 2 irregular rows. Anteriorly 4 canines in upper and lower jaw, the outer pair in both jaws longer than the inner pair, and curved outwards. Dorsal consisting of IX spines and 11 (12) rays. Anal with III spines, the last of which is longest, and 9 (10) soft rays. Pectorals rounded. Ventrals pointed. Caudal slightly rounded.

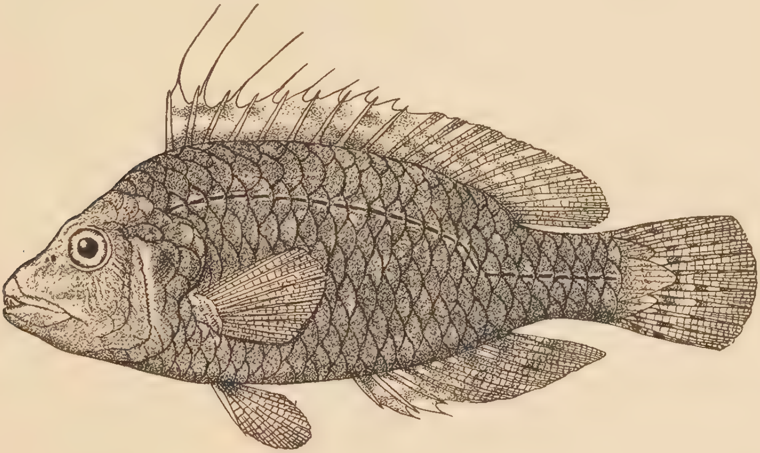

Fig. 23. *Duymaeria flagellifera* (C. V.). × 2/3

Distribution: that of the single species known.

Note. Barnard (Ann. S. Afric. Mus. XXI, 1925—1927, p. 754) has followed Klunzinger (Verh. zool. bot. Ges. Wien

XXI, 1871, p. 551) in uniting the genera *Pteragogus* Peters and *Duymaeria,* the only difference being the number of dorsal spines, which is X—XI in the first named genus. As the species of *Pteragogus* are restricted to the Red Sea, and as the number of dorsal spines is rather constant in the genera of Labroids, I prefer to keep *Duymaeria* separate.

1. **Duymaeria flagellifera** (C. V.) (Fig. 23, p. 139)

Ctenolabrus flagellifer Cuvier & Valenciennes, Hist. Nat. Poissons XIII, 1839, p. 240.
Ctenolabrus aurigarius Richardson, Voyage Sulphur. Fishes, 1844, p. 90.
Ctenolabrus rubellio Richardson, ibid. p. 93.
Ctenolabrus flagellifer Schlegel, Fauna Japonica, Poissons, 1845, p. 166.
Crenilabrus nematopterus Bleeker, Nat. Tijdschr. Ned. Indië II, 1851, p. 250.
Crenilabrus enneacanthus Bleeker, ibid. IV, 1853, p. 120.
Crenilabrus spilogaster Bleeker, ibid. VI, 1854, p. 416.
Cossyphus filamentosus Peters, Wiegm. Arch. 1855, p. 263.
Duymaeria flagellifer Bleeker, Acta Soc. Sc. Indo-Neerl. I, 1856. Beschr. Vischs. Amboina, p. 53.
Duymaeria japonica Bleeker, l.c.
Duymaeria aurigaria Bleeker, l.c.
Duymaeria rubellio Bleeker, l.c.
Duymaeria nematopterus Bleeker, ibid. p. 54. — Atl. Ichth. I, 1862, p. 79.
Duymaeria enneacanthus Bleeker, l.c. — ibid. p. 78.
Duymaeria spilogaster Bleeker, l.c.
Duymaeria amboinensis Bleeker, l.c. — Atl. Ichth. I, 1862, p. 78.
Duymaeria aurigaria Günther, Cat. Brit. Mus. IV, 1862, p. 121.
Duymaeria flagellifera Günther, l.c.
Duymaeria spilogaster Günther, ibid. p. 122.
Duymaeria filamentosa Günther, l.c.
Duymaeria caeruleomaculata Günther, l.c.
Duymaeria enneacanthus Günther, ibid. p. 123.
Duymaeria nematoptera Günther, l.c.
Duymaeria aurigaria Kner, Novara Exp. Fische I, 1865, p. 249.
Duymaeria filamentosa Günther, Fishes of Zanzibar, 1866, p. 88.
Duymaeria filamentosa Steindachner, Sitzber. Akad. Wien LX, 1869, p. 566.
Duymaeria flagellifera Günther, Zool. Challenger Exp. VI, 1880, p. 53.
Duymaeria caeruleomaculata Günther, Fische der Südsee II, 1881, p. 244.
Duymaeria japonica Steindachner & Döderlein, Denkschr. Akad. Wien LIII, 1887, p. 273.
Duymaeria flagellifera Jordan & Snyder, Proc. U. S. Nat. Mus. XXIV, (1901) 1902, p. 623.
Duymaeria (amboinensis?) M. Weber, Siboga Exp. Fische, 1913, p. 363.
Pteragogus (Duymaeria) filamentosus Barnard, Ann. S. Afric. Mus. XXI, 1925—1927, p. 755.
Duymaeria flagellifera Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 330.
Duymaeria nematoptera Fowler, l. c.
Duymaeria flagellifera Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 216.

Duymaeria guttata Fowler & Bean, ibid. p. 218.
Duymaeria flagellifera P. J. Schmidt, Trans. Pac. Comm. Acad. Sc. USSR I, 1930, p. 74.
Duymaeria enneacanthus Herre & Myers, Bull. Raffles Mus. XIII, 1937, p. 36.
Duymaeria nematopterus Herre & Myers, l. c.

D. IX. 11 (12). A. III. 9 (10). P. 2. 10—11. V. I. 5. Ll. 25. Ltr. $\begin{array}{c}2\\ \hline 1\\ \hline 7\end{array}$.

Height 2.5—2.6, 2.9—3.1 in length with caudal. Head 2.8—3, 3.3—3.8 in length with caudal. Height of head about equal to its length. Eye 4.1—5, equal to nearly flat interorbital space and 1.5—1.8 in snout. Mouth rather large, somewhat protractile, slightly oblique. Maxillary reaching to below frontborder of eye. Two rows of deciduous scales on preopercle, which leave a broad posterior and inferior limb naked. The denticulations of the hindborder of the preopercle are fine and numerous, coarser and less numerous in small specimens. Dorsal spines rather strong, slightly increasing in length posteriorly; the first less than snout, the last somewhat more than snout. The membranes deeply incised between each spine and supported by a bundle of tiny rays which stand out from the spines. These supports greatly elongate into long filaments in the first and second or first to third spines of males. Soft dorsal slightly higher than spinous part, pointed behind, the membranes between the rays scarcely incised. Anal spines strong, the third longer, but less strong than the second and about as long as longest dorsal spine. The membranes incised behind the spines as in the dorsal and supported in the same way; these supports sometimes also produced into filaments. Soft anal similar to soft dorsal. Pectorals equal to head without snout. Ventrals equal to snout and eye together. Caudal slightly rounded. Height of caudal peduncle about equal to snout. Colour of preserved specimens very variable. Generally lighter or darker brown, with or without traces of light longitudinal bands or rows of spots on the body. Operculum often light behind, with a dark brown patch in the middle of the light area, sometimes also forming a longitudinal streak downwards. The males are generally darker than the females and have more or less developed black blotches along the base of the dorsal. There is often a dark spot, bordered above by white, between the first and second dorsal spines; the rest of the fin is more or less striped with dark brown lines or reticulations, forming sometimes darker patches, which join those of the body. Anal sometimes similarly marked, or with alternating dark and light patches along its basal part. Caudal more or less distinctly barred vertically. Pectorals hyaline, with or without a dark band along their base. Ventrals sometimes dark, or hyaline with rows of milky white spots. In the female the fins are more or less uniformly yellowish. Length 190 mm.

Habitat: Singapore; Talaut Islands!; Ambon; Tidore; Banda; New Guinea (South East Coast). — Mozambique, Zanzibar, Muscat, Aden, Japan, China, Riu Kiu Islands, Formosa, Philippines, New Hebrides, Aneitum. In sea.

Note. After the study of my material and after having consulted the different authors on the subject I come to the conclusion that at present only one species of *Duymaeria* can be recognized, which is very variable in colour. There is no reason to separate specimens with or without filaments, now that it has been shown that the males differ from the females in colour and specially in the presence of these filaments. I have also seen males from the same locality with and without filamentous anal spines.

The other characteristics which have been used to distinguish species of this genus are mainly differences of colour. According to literature the colour of specimens during life is very different from that of preserved ones. Dark blotches, light stripes may appear in the preserved specimens, which were not visible in the living fish. It seems therefore impossible to found species of *Duymaeria* on differences of colour or of markings.

20. **Hemigymnus** Günther

(Günther, Ann. Mag. Nat. Hist. VIII, 1861, p. 386).
Cheilolabrus Alleyne & Macleay, Proc. Linn. Soc. New S. Wales I, 1877, p. 345.

Oblong, compressed, body covered with large scales, those of thorax and nape much smaller, and imbedded in the skin. Lateral line continuous, running anteriorly in the upper part of the body, sharply deflected below soft dorsal and continued on middle of caudal peduncle. Head naked, with exception of a narrow transverse band of thin scales, partly imbedded in the skin, on posterior and inferior part of cheeks. Preopercle smooth. Lips very thick, the upper one plated, the lower one split in the middle and therefore consisting of two pendant lobes. A single series of conical teeth in the jaws, generally with some small molariform teeth at the lingual sides of this series. Anteriorly two large, almost horizontal canines in each jaw. Dorsal consisting of IX spines and

10—11 rays. Anal with III spines and 11 rays. Caudal truncate or somewhat rounded. Pectorals rounded. Ventrals with I spine and 5 rays, the first ray somewhat produced. Branchiostegal membranes broadly attached to isthmus.

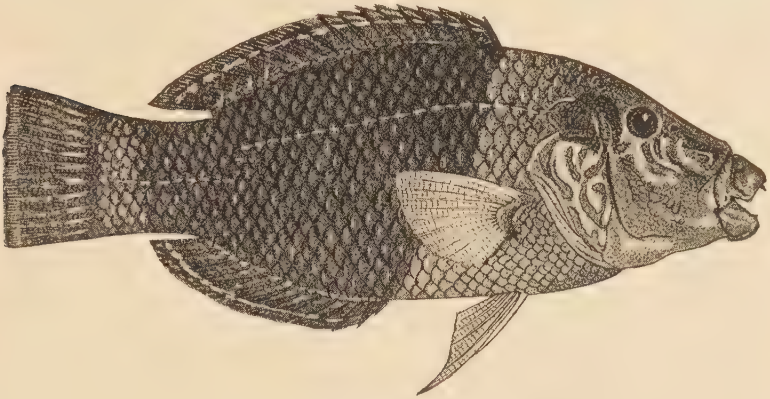

Fig. 24. *Hemigymnus melapterus* (Bl.) × 4/9

Distribution. Tropical and subtropical parts of Indo-Pacific.

Note. Jordan (Genera of Fishes II, 1919, p. 200) cites *Thalliurus* Swainson as the oldest name for this genus, saying: "haplotype *Labrus blochi* = *Labrus fuliginosus* Lac. Replaces *Hemigymnus* Gthr, 1864". Swainson however designated "*C. Blochii*", Bloch, pl. 260" as the type of this genus. On pl. 260 *Sparus chlorurus* = *Cheilinus chlorurus* is figured and it is clear from the description that Swainson meant this fish and not a species of *Hemigymnus*. *Thalliurus* is therefore a synonym of *Cheilinus*.

Key to the Indo-australian species of Hemigymnus

1. Body dark with several light transverse bands. Base of pectorals dark . . . . 1. *H. fasciatus* p. 143.
2. Body dark posteriorly, more or less lighter anteriorly, without light bands, or with one transverse band at base of dorsal. Base of pectoral not dark . . . . 2. *H. melapterus* p. 145.

1. **Hemigymnus fasciatus** (Bl.)

Labrus fasciatus Bloch, Ausl. Fische VI, 1792, p. 6.
Labrus fuliginosus Lacepède, Hist. Nat. Poissons III, 1802, p. 437, p. 493.

Sparus zonephorus Lacepède, ibid. IV, 1802, p. 51, p. 155.
Sparus meaco Lacepède, ibid. p. 54, p. 160.
Labrus melapteronotus Lacepède, ibid. p. 450.
Scarus quinque fasciatus Bennett, Fishes of Ceylon, 1830, No. 23.
Halichoeres sexfasciatus Rüppell, Neue Wirbelth. Fische, 1835, p. 18.
Tautoga fasciata Cuvier & Valenciennes, Hist. Nat. Poissons XIII, 1839, p. 303.
Tautoga sexfasciata Cuvier & Valenciennes, ibid. p. 309.
Cheilinus Blochii, Cuvier & Valenciennes, ibid. XIV, 1839, p. 108.
Tautoga fasciata Bleeker, Nat. Tijdschr. Ned. Indië IV, 1853, p. 484.
Tautoga leucomos Bleeker, ibid. XV, 1858, p. 239.
Hemigymnus fasciatus Günther, Ann. Mag. Nat. Hist. 1861, p. 386. — Cat. Brit. Mus. IV, 1862, p. 138.
Hemigymnus fasciatus Bleeker, Atl. Ichth. I, 1862, p. 141.
Hemigymnus leucomus Bleeker, ibid. p. 142.
Hemigymnus sexfasciatus Günther, Cat. Brit. Mus. IV, 1862, p. 139.
Hemigymnus leucomus Günther, l.c.
Hemigymnus fasciatus Klunzinger, Verh. zool. bot. Ges. Wien, XXI, 1871, p. 547.
Hemigymnus fasciatus Day, Fishes of India, Part III, 1877, p. 396.
Hemigymnus fuliginosus Jordan & Seale, Bull. Bur. Fish. XXV, (1905) 1906, p. 295.
Hemigymnus fasciatus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 337.
Hemigymnus fasciatus Fowler & Bean, Bull. U. S. Nat. Mus. 100, Vol. VII, 1928, p. 245.
Hemigymnus fasciatus P. J. Schmidt, Trans. Pac. Comm. Acad. Sc. USSR. I, 1930, p. 72.
Thalliurus fasciatus Roxas & Martin, Bur. Sc. Manila, Techn. Bull. VI, 1937, p. 210.

D. IX. 11. A. III. 11. P. 2. 12. V. I. 5. Ll. 29. Ltr. $\frac{4\frac{1}{2}}{\frac{1}{14}}$.

Height 2.6, 3.1—3.2 in length with caudal. Head 2.6—2.8, 3.1—3.4 in length with caudal. Height of head 1.2 in its length. Eye 7—7.6, 2.6—3.8 in snout and 1.6—1.7 in flat or even somewhat concave interorbital space. Mouth small, horizontal. Maxillary by far not reaching to below anterior nostril. Teeth compressed, rounded at top, in one series in the jaws, followed on the lingual side by some round molariform teeth. Anteriorly in both jaws two almost horizontal canines, those of the upper jaw longer than those of the lower jaw. Lower and posterior part of cheeks with 2 or 3 rows of thin scales, partly imbedded in the skin. Posterior and inferior preopercular limb naked. 16—17 rows of scales before dorsal, the anterior ones small, thin and more or less imbedded in the skin. Dorsal spines slender, but stiff and pungent, the first shorter than eye, the last equal to distance between posterior border of eye and posterior nostril. Soft dorsal higher than spinous part, the longest ray more than twice eye. First anal spine minute, third longest, slightly longer than last dorsal spine. Soft anal as deep as soft dorsal. Pectorals about equal to snout and eye, ventrals pointed, slightly shorter. Caudal truncate or slightly rounded. Colour of preserved specimens dark brown, head and thorax before base of pectorals and ventrals yellowish or pinkish. Head with light bluish, dark edged bands, which are not always conspicuous. A horizontal one from hindborder of preopercle, below eye to snout, where it meets that of the other side. Above and parallel to it a somewhat narrower one, from frontborder of eye to snout. A band from chin to preopercular angle. Two more or less curved bands on opercle. A dark blotch behind eye. Body with 4 yellowish or light pinkish transverse bands, broadest below and tapering towards the back, where they get indistinct. First band half way length of ventrals, behind the base of that fin, second just before anal, third above middle and fourth above end of anal. The posterior band may be indistinct. A dark spot in middle of base of caudal may be present. Dorsal reddish brown, with a terminal dark border and a row of dark spots, more conspicuous between the rays than between the spines. Anal similar, but darker. Caudal dark brown. Pectorals yellowish, black or brown at base. Ventrals lighter or darker brown. Length 750 mm.

Habitat: Nias; Biliton; Java (Batavia); Tidore; Gomoro Island; Ambon; New Guinea. — Red Sea, Zanzibar, Mauritius, Réunion, coast of British India, Ceylon, Japan, Riu Kiu Islands, Philippines, Admirality Islands, Carolines, Rotuma, Samoa. In sea.

2. **Hemigymnus melapterus** (Bl.). (Fig. 24, p. 143)

Labrus melapterus Bloch, Ausl. Fische V, 1791, p. 137.
Tautoga melapterus Cuvier & Valenciennes, Hist. Nat. Poissons XIII, 1839, p. 311.
Tautoga melapterus Richardson, Ann. Mag. Nat. Hist. XI, 1843, p. 358.
Tautoga melapterus Bleeker, Verh. Bat. Gen. XXII, (1847) 1849. Gladsch. Labr. p. 15, p. 16.
Tautoga dimidiatus Bleeker, ibid. p. 18.
Tautoga melanopterus Bleeker, Acta Soc. Sc. Indo-Neerl. VIII, 1860. Dertiende bijdr. Vischf. Celebes, p. 19.
Hemigymnus melanopterus Günther, Ann. Mag. Nat. Hist. VIII, 1861, p. 386. — Cat. Brit. Mus. IV, 1862, p. 139.
Hemigymnus melapterus Bleeker, Atl. Ichth. I, 1862, p. 142.
Hemigymnus melanopterus Kner, Novara Exp. Fische I, 1865, p. 253.
Hemigymnus melanopterus Günther, Fishes of Zanzibar, 1866, p. 92.
Labrichthys bicolor Day, Proc. Zool. Soc. London, 1870, p. 696.
Hemigymnus melapterus Day, Fishes of India, Part III, 1877, p. 396.

Cheilolabrus magnilabris Alleyne & Macleay, Proc. Linn. Soc. New S. Wales I, 1877, p. 345.
Hemigymnus melanopterus Klunzinger, Sitzber. Akad. Wien, 1880, p. 404.
Hemigymnus melanopterus Günther, Fische der Südsee II, 1881, p. 253.
Hemigymnus melanopterus Macleay, Descr. Cat. Austr. Fish. II, 1881, p. 93.
Hemigymnus melapterus Jordan & Snyder, Proc. U. S. Nat. Mus. XXIV, (1901) 1902, p. 634.
Hemigymnus melapterus Jordan & Seale, Bull. Bur. Fish. XXV, (1905) 1906, p. 294.
Hemigymnus melapterus Steindachner, Sitzber. Akad. Wien CXV, 1906, p. 1398.
Hemigymnus melapterus McCulloch, Proc. Linn. Soc. New S. Wales XL, Part 2, 1915, p. 265.
Hemigymnus melapterus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 337.
Hemigymnus melapterus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 247.
Thalliurus melapterus McCulloch, Checklist Fish. Austr. Part II, 1929, p. 312.
Hemigymnus melapterus P. J. Schmidt, Trans. Pac. Comm. Acad. Sc. USSR. I, 1930, p. 73.
Hemigymnus (Cheilolabrus) melapterus Whitley, Rep. Great Barrier Reef. Exp. Brit. Mus. IV, no 9, 1932, p. 294.
Hemigymnus melapterus Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 306.
Thalliurus melapterus Roxas & Martin, Bur. Sc. Manila, Techn. Bull. VI, 1937, p. 210.

D. IX. 10—11. A. III. 11. P. 2. 12. V. I. 5. Ll. 28. Ltr. $\begin{array}{c}4\frac{1}{2}\\\hline 1\\\hline 13\text{—}15\end{array}$.

Height 2.6—2.7, 3.2—3.3 in length with caudal. Head 2.6—2.7, 3.2—3.3 in length with caudal. Height of head 1.1—1.2 in its length. Eye 5.7—8, 2.5—5.1 in snout and 1.3—2 in somewhat convex interorbital space. Mouth small, horizontal. Maxillary by far not reaching to below anterior nostril. Teeth somewhat compressed, specially in the lower jaw, with rounded tops, in a single series, followed lingually by a few molariform teeth. Anteriorly in both jaws two almost horizontal canines, those of the upper jaw longer than those of the lower jaw. Lower and posterior part of cheeks with a few rows of thin scales, imbedded in the skin. Posterior and inferior preopercular limb naked. About 16 rows of scales before dorsal, the 10 anterior rows consisting of small thin scales, imbedded in the skin. Dorsal spines stiff and pungent; the first shorter than eye in large specimens, longer than eye in smaller ones. The last spine longer than eye, twice as long as eye in small specimens. Soft dorsal higher than spinous part. First anal spine minute, less pungent than following, third longest, somewhat shorter than longest dorsal spine. Soft anal as deep as soft dorsal. Pectorals rounded, as long as snout or as snout and eye. Ventrals pointed, slightly shorter. Caudal truncate or slightly rounded. Colour of preserved specimens dark brown posteriorly, lighter anteriorly, the two colours separated in small specimens by a light white or yellowish area, beginning as a transverse band on back at base of dorsal and widening below, reaching on lower side from isthmus almost to anal. This light area is less distinct in older and disappears in aged specimens, where the belly is only lighter. Sometimes however the light colour spreads in old specimens, leaving only the back dark. Head with more or less distinct sinuated bands and with a large bluish black blotch behind eye. Eye often with a white ring. Scales of body dark edged in old specimens. Dorsal and anal dark brown or violet, spotted with dark, with a still darker submarginal and a light terminal band, the submarginal band sometimes light blue, bordered above and below with a narrow black line. Pectorals light yellowish, with or without a very faint darker base; sometimes the upper rays are also somewhat darker. Ventrals light yellowish or pinkish. Caudal peduncle often lighter than rest of body, especially in young specimens. Caudal light or darker yellow or reddish, darker towards its tip and with more or less distinct darker transverse markings. Length 365 mm.

Habitat: Pulu Weh!; Singapore; Sumatra (Siboga); Simalur!; Batu Islands; Nias; Bintang; Java (Batavia); Duizend Islands!; Borneo (Sandakan); Celebes (Makassar, Bulukomba, Menado, Libany Bay); Limbe Strait; Sulu Islands!; Batjan; Ternate; Ambon; Ceram; Banda!; Flores!; Timor; New Guinea (Manokwari, Port Moresby). — Madagascar, Zanzibar, Mauritius, coast of British India, Andamans, Cocos Keeling Islands, Annam, Indo China, Riu Kiu Islands, Philippines!, Pelew Islands, Carolines, Solomon Islands, New Hebrides, Queensland, Samoa. In sea.

21. **Labroides** Bleeker

(Bleeker, Natuurk. Tijdschr. Ned. Indië II, 1851, p. 249)
Fissilabrus Kner, Sitzsber. Akad. Wiss. Wien, XL, 1860, p. 14.

Body compressed, rather elongate, covered with large or moderate scales, which form a low sheath on dorsal and anal. Head pointed, naked with exception of the sub- and postorbital region and the opercle. Mouth very small. Lips thick, swollen, the upper one generally with a shallow median furrow at its innerside, the lower one scarcely developed in its median part and only represented here by a frenulum, which connects the two lateral parts. These are produced into a small horizontal lobe at their anterior extremity, where they are jointed to the frenulum. Teeth in the jaws small, pointed, in a crowded row laterally, in several rows near symphysis. Two more or less curved canines anteriorly in each jaw, the lower ones more distant than the upper ones, which fit between the lower ones when the mouth is closed. Preopercle smooth. Lateral line complete, with a bent downwards below posterior part of soft dorsal. Dorsal consisting of IX spines and 10 or 11 soft rays. Anal with III spines and 9—10 soft rays. Pectorals somewhat rounded. Ventrals pointed. Caudal truncate or slightly rounded.

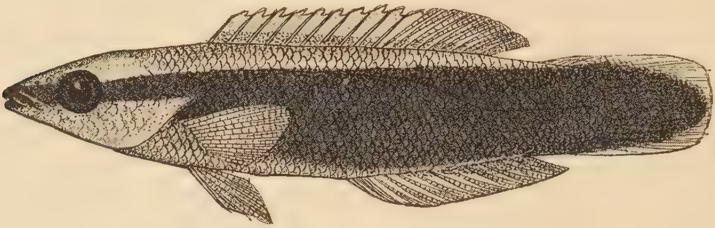
Fig. 25. *Labroides dimidiatus* (C. V.). × 2$^3/_4$

Distribution. Small fishes, living near reefs. A few species known from the Red Sea and the tropical and subtropical parts of the Indic and Pacific.

Note. In the aquarium of Amsterdam I observed that *Labroides dimidiatus* cleans the surrounding of the mouth and the gill-openings of large fishes (Het Aquarium IV, 1936, p. 153), in the same way as has been observed by Beebe for the Atlantic species *Iridio bivittatus*. It is not impossible that other Labroid fishes do the same.

Key to the Indo-australian species of Labroides

1. Ll. 52—53. A dark band from snout to end of caudal 1. *L. dimidiatus* p. 148.
2. Ll. 28. Head and anterior part of body dark, posterior part of body and tail light . . . . . 2. *L. bicolor* p. 150.

1. **Labroides dimidiatus** (C.V.). (Fig. 25. p. 148)

Labrus latovittatus Rüppell, Neue Wirbelth. Fische, 1835, p. 2 (nec Lac.).
Cossyphus dimidiatus Cuvier & Valenciennes, Hist. Nat. Poissons XIII, 1839, p. 136.
Labroides paradiseus Bleeker, Nat. Tijdschr. Ned. Indië II, 1851, p. 249. — Atl. Ichth. I, 1862, p. 155.
Labroides latovittatus Bleeker, Acta Soc. Sc. Indo-Neerl. II. Achtste bijdr.

Vischf. Amboina, p. 73. — Atl. Ichth. I, 1862, p. 155.
Labroides dimidiatus Günther, Cat. Brit. Mus. IV, 1862, p. 119.
Labroides paradiseus Günther, l c.
Labroides dimidiatus Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 548.
Labroides dimidiatus Day, Fishes of India, Part III, 1877, p. 393.
Labroides dimidiatus Günther, Fische der Südsee II, Part 2, 1881, p. 243.
Labroides dimidiatus Barnard, Ann. S. Afric. Mus. XXI, 1925—1927, p. 749.
Labroides dimidiatus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 222.
Labroides dimidiatus Whitley, Rec. Austr. Mus. XVI, 1928, p. 221.

D. IX. 10—11. A. III. 10. P. 2. 11. V. I. 5. Ll. 52—53. Ltr. $\begin{array}{c} 3\frac{1}{2}\text{—}4\frac{1}{2} \\ \hline 1 \\ \hline 12\text{—}14 \end{array}$.

Height 4.5—4.6, 5.2 in length with caudal. Head 3.4—3.8, 4—4.2 in length with caudal. Height of head 1.6—1.8 in its length. Eye 4.6—4.8, 1.3—1.7 in snout and 1.1—1.4 in somewhat convex interorbital space. Mouth very small, horizontal. Lips swollen, the upper one with a median furrow, the lower one separated in two by a median frenulum and produced into a rounded lobe. Small pointed teeth in a crowded row in both jaws, in several rows near symphysis. Two somewhat curved canines anteriorly in each jaw. A canine at corner of mouth. Head naked, with exception of the superior and posterior part of the preopercle and the opercle. On upper part of head the scales begin far behind eye. About 14 rows of scales before dorsal. Dorsal spines pungent, short; the first about as long as eye, the last one one eye diameter and a half. Soft dorsal higher than spinous part, the longest ray equal to snout and eye together. Anal spines slender, pungent. The first about half as long as the second, the third longest, almost equal to snout and eye together. Soft anal similar to soft dorsal. Caudal truncate or slightly rounded. Pectorals as long as head without snout. Ventrals pointed, equal to snout and eye together. Colour of preserved specimens light pinkish brown above, generally lighter or white below, the two colours separated by a brown or blackish band, beginning at snout, running through eye to end of caudal, widening considerably on body, the dark colour spreading on the back and almost reaching to the base of the soft dorsal in some specimens. On the caudal the band is again narrower, leaving the upper and lower part of the fin white. A more or less developed brown band, running along lower part of caudal peduncle and continued on lower part of caudal, where it joins the median band or ends at some distance from it. An oblique brown stripe from lower part of base of pectoral to base of ventral, less conspicuous or absent in large specimens. Anterior part of spinous dorsal dark brown, posterior part with a white terminal edge, which widens on the soft dorsal. Here the upper half of the fin is white, the lower brown. Anal white, with a brown base. Pectorals and ventrals yellowish. Length 93 mm.

Habitat: Sumatra (Kauer); Java (Patjitan); Celebes (Menado); Sangi Islands; Sulu Islands!; Ternate; Batjan; Ambon; Haruko; Banda!; Goram; Letti; Savu!; Timor; Waigeu; New Guinea (South East and North East Coast). — Coast of Natal, Zanzibar, Red Sea, Mauritius, Maledives, Coromandel Coast, Andamans, Cocos Keeling Islands, Philippines, Pelew Islands, Yap, New Hebrides, Lord Howe Island, Queensland, Rotuma, Samoa, Hawaii, Tahiti. In sea.

2. **Labroides bicolor** Fowler & Bean

Labroides bicolor Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 224.
Labroides bicolor Hardenberg, Treubia XV, 1936, p. 377.

D. IX. 11. A. III. 9. P. 2. 11. V. I. 5. Ll. 28. Ltr. $\begin{array}{c}4\\\hline 1\\\hline 10\end{array}$.

Height 3.9, 4.6 in length with caudal. Head 3, 3.4 in length with caudal. Height of head 1.9 in its length. Eye 6.6, 2.5 in snout and twice in slightly convex interorbital space. Mouth very small, horizontal. Lips swollen, the upper lip longer than the lower one and with a median furrow. The lower lip divided into two lobes, connected by a transverse frenulum. Small pointed teeth in a single row in the sides of the jaws and in an elongate patch near symphysis. This patch almost at right angles with the row of teeth on the sides. Two short but stout and almost straight canines in each jaw, slightly before the row of small teeth and situated at the point, where the row of the sides meets the symphysial patch. The canines of the lower jaw distant, those of the upper jaw fitting between them. Suborbital, preopercle and opercle covered with small scales, those of the opercle somewhat larger. Head naked above, the scales beginning here far behind eye. About 12 irregular rows of scales before dorsal. First dorsal spine shorter than eye, ninth spine somewhat more than eye. Longest dorsal rays almost as long as snout. First anal spine half as long as second which is slightly shorter than third. Third anal spine somewhat longer than longest dorsal spine. Soft anal as deep as soft dorsal. Pectorals equal to head without snout, ventrals with the first ray produced, about equal to postorbital part of head. Caudal rounded. Colour of preserved specimen: Head dark brown, anterior part of body still deeper brown or blackish violet, as far as an oblique line from below last dorsal spines to middle of anal. Basal scaly sheath of dorsal and anal also of that colour. Rest of body and tail cream coloured, some of the scales with brown patches. Dorsal, anal, and ventrals blackish violet. Dorsal and anal with a rather broad light greenish edge. Pectorals dusky. Caudal light greenish with a broad black subterminal crescent. Length of specimen described and largest specimen known 138 mm.

Habitat: Java (Batavia!). — Philippines.

22. **Diproctacanthus** Bleeker

(Bleeker, Proc. Zool. Soc. 1861, p. 415)

Body compressed, rather elongate, covered with rather large scales. Head pointed, opercular region and cheeks covered with small scales. Mouth moderate, scarcely protractile. Upper lip thick, wrinkled above, with a shallow median furrow. Lower lip thin along sides of jaw, thick and transverse near symphysis, without median frenulum. Teeth very small, somewhat pointed, in a single series in sides of jaws. Two moderate canines anteriorly in each jaw. Dorsal consisting of IX spines and 9—10 (11) rays. Anal with II spines and 9 (10) rays. Pectorals rounded. Ventrals pointed. Caudal somewhat rounded. Vertical fins with a low basal sheath. Lateral line continuous. Gillmembranes attached to isthmus.

Distribution: that of the single species known.

1. **Diproctacanthus xanthurus** (Blkr.). (Fig. 26, p. 152)

Labroides xanthurus Bleeker, Acta Soc. Sc. Indo-Neerl. I, 1856. Beschr. vischs. Manado, p. 52.
Diproctacanthus xanthurus Bleeker, Proc. Zool. Soc. London, 1861, p. 415. — Atl. Ichth. I, 1862, p. 156.
Labroides xanthurus Günther, Cat. Brit. Mus. IV, 1862, p. 120.
Diproktacanthus xanthurus Bleeker, Ned. Tijdschr. Dierk. II, 1865, p. 277.
Diproctacanthus xanthurus de Beaufort, Bijdr. Dierk. Afl. 19, 1913, p. 131.
Labroides xanthurus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 223.

D. IX. 9—10 (11). A. II. 9—10. P. 2. 11. V. I. 5. Ll. 35—43.

Ltr. $\begin{array}{c} 5 \\ \hline 1 \\ \hline 14\text{—}17 \end{array}$.

Height 3.1—3.8, 4—4.3 in length with caudal. Head 2.5—2.9, 3—3.3 in length with caudal. Height of head 1.6—1.7 in its length. Eye 3—5.5, 1.3—1.6 in snout and 1—1.6 in flat interorbital space. Mouth very small, oblique. Upper lip slightly projecting before lower lip. Corner of mouth far before vertical through anterior nostril. Scales beginning on head above hindborder of preopercle. About 16—20 rows of very small scales before dorsal. Dorsal spines short and slender, subequal, shorter than or equal to eye. Soft dorsal slightly higher than its spinous part. Second anal spine much longer than first, as long as dorsal spines. Soft anal similar to soft dorsal. Pectorals as long as snout and eye; ventrals half diameter of eye shorter. Caudal somewhat rounded. Colour of preserved specimens olive grey or brownish, head lighter. Two longitudinal silvery bands, tapering posteriorly: one from hindborder of eye to base of superior caudal rays, the other from corner of mouth, immediately below eye, through base of pectoral to base of submedian caudal rays. The space between these bands darker than the rest of the body, forming a more or less pronounced dark longitudinal band from upper lip through eye to base of caudal. A faint silvery stripe along base of dorsal and anal. Length 97 mm.(Type in British Museum examined).

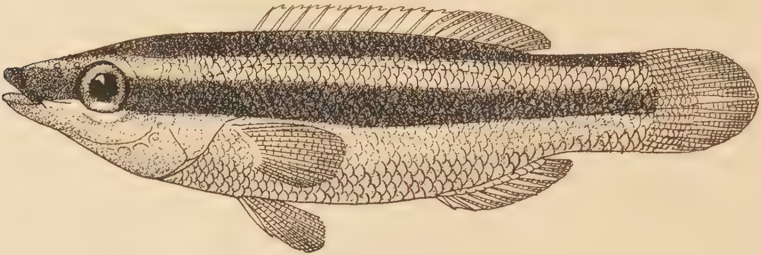

Fig. 26. *Diproctacanthus xanthurus* (Blkr.) × 3

Habitat: Celebes (Menado); Sulu Islands!; Ceram; Ambon! — Philippines. In sea.

23. **Labrichthys** Bleeker

(Bleeker, Nat. Tijdschr. Ned. Indië VI, 1854, p. 331)

Thysanocheilus Kner, Denkschr. Akad. Wiss. Wien XXIV, 1864, p. 4.
Chaerojulis Kner & Steindachner, Sitzber. Akad. Wien LIV, 1866, p. 394.

Oblong, compressed, head pointed. Body covered with large scales, those of thorax and those before dorsal smaller. Head totally scaly, with exception of the lips. The scales of superior and anterior part of head much smaller than those of opercles. Lateral line complete, with a bent below posterior part of dorsal, and continued on middle of caudal peduncle, which is short and deep. Mouth very small, the lips produced anteriorly into a short rounded tube when the mouth is closed. One row of small crowded teeth in the jaws and four canines anteriorly in the upper jaw, two in the lower jaw. Dorsal consisting of IX spines and 11 rays. Anal with III spines and 11 rays. All vertical fins densely covered with small scales almost to their end. Pectorals rounded. Ventrals pointed. Caudal rounded. Gillmembranes attached to isthmus.

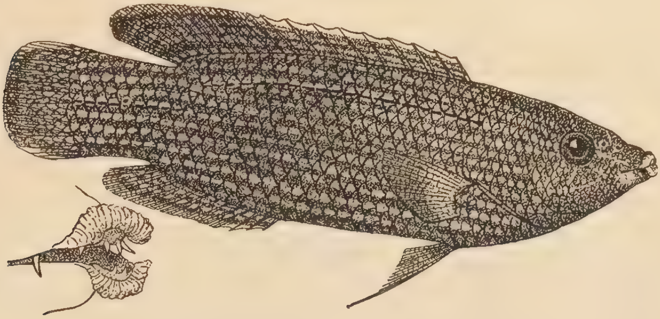

Fig. 27. *Labrichthys cyanotaenia* Blkr. n. s.

Distribution: that of the single species known.

Note. Although Gill (Proc. U. S. Nat. Mus. XIV, 1891, p. 395) has shown more than 45 years ago, that Günther (Cat. Brit. Mus. IV, 1862, p. 112) made a mistake in uniting the genera *Labrichthys* and *Pseudolabrus* of Bleeker, even in recent times species have been described as belonging to *Labrichthys,* which have nothing to do with this very peculiar genus.

1. **Labrichthys cyanotaenia** Blkr. (Fig. 27, p. 153)

Labrichthys cyanotaenia Bleeker, Nat. Tijdschr. Ned. Indië VI, 1854, p. 331. — Atl. Ichth. I, 1862, p. 154.

Thysanocheilus ornatus Kner, Denkschr. Akad. Wiss. Wien XXIV, 1864, p. 4. — Ann. Mag. Nat. Hist. (3) XV, 1865, p. 77.

Chaerojulis castaneus Kner & Steindachner, Sitzber. Akad. Wien LIV, 1866, p. 394.

Thysanocheilus cyanotaenia Günther, Proc. Zool. Soc. London 1869, p. 241. — Fische der Südsee II. Prt 2, 1881, p. 242.

Labrichthys cyanotaenia Jordan & Seale, Bull. Bur. Fish. XXV, (1905) 1906, p. 294.

Labrichthys cyanotaenia Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 220.
Labrichthys cyanotaenia Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 331.
Labrichthys cyanotaenia P. J. Schmidt, Trans. Pac. Comm. Ac. Sc. USSR. I, 1930, p. 74.
Labrichthys cyanotaenia Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 304.

D. IX. 11. A. III. 11. P. 2. 13. V. I. 5. Ll. 28. Ltr. $\begin{array}{c}3\frac{1}{2}\\ \hline 1\\ \hline 11\end{array}$.

Height 3.3—3.4, 3.7—3.9 in length with caudal. Head 2.8—3, 3.2—3.4 in length with caudal. Height of head 1.4—1.5 in its length. Eye 5.4—6, 1.8—2 in snout and 1.2—1.5 in somewhat convex interorbital space. Mouth small, horizontal, not protractile. Maxillary not reaching to below anterior nostril, which is situated rather high up, as well as the posterior nostril. Lips pouting, forming anteriorly a short rounded tube when the mouth is closed, with numerous longitudinal wrinkles in their anterior swollen part, forming a more or less distinct row of papillae along their frontborder. One fleshy plate at the innerside of the lips, ending in a short papilla at symphysis and suggesting an inner lip. One row of small pointed crowded teeth in the jaws. Four canines in the upper jaw, two canines in the lower jaw, lastnamed close together and fitting in between the inner pair of the upper jaw. A posterior canine in upper jaw at some distance before corner of mouth. Head scaly, with exception of the lips. The scales of the anterior and superior part of the head smaller than those on opercles. Dorsal spines stiff and pungent, the first shorter than eye, the last about one eye diameter and a half. Soft dorsal somewhat higher than spinous part, pointed behind. First anal spine minute, third longest, about as long as last dorsal spine. Soft anal similar to soft dorsal. Caudal rounded. All vertical fins covered by scales almost to their ends. Pectorals rounded, equal to or somewhat longer than eye and snout together. Ventrals pointed, longer or much longer than pectorals. Colour of preserved specimens dark brown, including the fins. Vertical fins with white edges. Scales of body and tail with a light centre, forming narrow and rather indistinct longitudinal stripes, corresponding to the rows of scales. A blackish blotch at base of pectorals. Length 162 mm.

Habitat: Sulu Islands!; Tidore; Banda. — Zanzibar, Philippines, Riu Kiu Islands, Solomon Islands, Samoa. In sea.

Note. Many authors have made the mistake of adding *Platyglossus ocellatus* Kner & Steindachner, Sitzber. Akad. Wien LIV, (1866), 1867, p. 377, to the synonymy of *L. cyanotaenia*. The description of this species is that of another than the one figured (Fig. 8). Kner and Steindachner corrected this mistake when describing *Chaerojulis castaneus* (l.c.).

24. **Stethojulis** Günther

(Günther, Ann. Mag. Nat. Hist. VIII, 1861, p. 386)

Elongate or somewhat oblong. Head conical. Body covered with large scales, those before dorsal and immediately behind isthmus somewhat smaller, but those of thorax as large or even much larger than those of sides. Head naked, excepting above, where the scales begin behind eye. Teeth incisiviform, close together, in a single series in both jaws. No canines, with exception of a posterior one at corner of mouth. Lateral line not interrupted, with a sharp bent downwards before caudal peduncle. Lips thick, plated. Vertical fins without scaly sheaths. Dorsal consisting of IX spines and 11 (12) rays. Anal with III spines and 10—11 rays, the first spine generally minute, sometimes wanting. Pectorals somewhat rounded. Ventrals short, the first ray not produced. Caudal rounded. Gillmembranes united to isthmus.

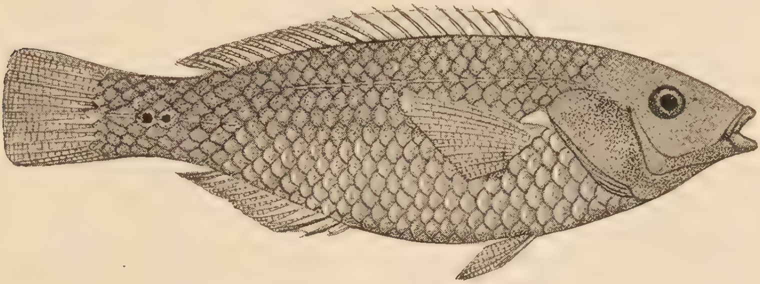

Fig. 28. *Stethojulis axillaris* (Q. G.). × $1^1/_7$

Distribution: On reefs in tropical and subtropical parts of Red Sea, Indic and Pacific.

Key to the Indo-australian species of Stethojulis

A. Head and body with longitudinal light bands (red in life), one along base of dorsal and three on sides.
  a. First band on sides from snout through eye to base of caudal, second from upper

lip, above base of pectoral, ending about 6 scales behind head, third from corner of mouth below pectoral to base of caudal . 1. *S. trilineata* p. 156.

b. First band on sides from snout through eye to base of caudal; second from upper lip to upper part of base of pectoral, third from gillopening to above anus . . . . 2. *S. renardi* p. 158.

c. First band on sides from snout through eye, ending on 5th scale of lateral line, second from upper lip, above base of pectoral, where it is somewhat deflected, ending above anus or continued to base of caudal, third from corner of mouth, curved downwards to lower part of subopercle, upwards again along hindborder of subopercle to base of pectoral, and continued to caudal . . . . 3. *S. albovittata* p. 159.

d. First band on sides from snout through eye, ending on superior border of opercle, second from upper lip, below eye to end of preopercle, third gillopening to base of caudal, but generally interrupted on sides for 9 or 10 scales . . . . 4. *S. interrupta* p. 161.

B. A silvery band on head from snout to upper extremity of subopercle. Scales of upper part of sides with silvery spots, lower part of sides and belly with about 5 silvery longitudinal bands. Caudal with brown cross bars . 5. *S. strigiventer* p. 163.

C. Lower half of sides and belly light, the scales with dark spots forming longitudinal rows.

a. Height 3—3.3 . . . . 6. *S. phekadopleura* p. 164.

b. Height 4—4.3 . . . . 7. *S. kalosoma* p. 165.

D. A triangular creamy spot above axil of pectoral. Generally two, sometimes three dark spots, edged with white, behind each other on posterior part of caudal peduncle . . . 8. *S. axillaris* p. 167.

1. **Stethojulis trilineata** (Bl. Schn.)

Labrus trilineatus Bloch Schneider, Syst. Ichth. 1802, p. 253.
Julis Sebanus Cuvier & Valenciennes, Hist. Nat. Poissons XIII, 1839, p. 474.
Julis (*Halichoeres*) *casturi* Bleeker, Nat. Tijdschr. Ned. Indië III, 1852, p. 768.
Halichoeres Sebae Kner, Sitzber. Akad. Wiss. Wien XL, 1860, p. 52.
Stethojulis trilineata Günther, Ann. Mag. Nat. Hist. VIII, 1861, p. 386. — Cat. Brit. Mus. IV, 1862, p. 140.
Stethojulis trilineata Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 291. — Atl. Ichth. I, 1862, p. 131.
Stethojulis trilineata Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 543.
Platyglossus trilineatus Peters, Monatsber. Akad. Berlin, 1876, p. 843.
Stethojulis trilineata Günther, Fische der Südsee II, Part 2, 1881, p. 255.
Stethojulis trilineata Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 336.

Stethojulis trilineata Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 243.

D. IX. 11 (12). A. III. 11. P. 2. 11. V. I. 5. Ll. 27—28. Ltr. $\begin{array}{c} 2\frac{1}{2} \\ \hline 1 \\ \hline 8-9 \end{array}$.

Height 2.9, 3.4—3.5 in length with caudal. Head 2.8—2.9, 3.4 in length with caudal. Height of head 1.3 in its length. Eye 6.8, 2.2—2.3 in snout and 1.6 in rather convex interorbital space. Mouth small, nearly horizontal. Maxillary not reaching to below anterior nostril. Teeth in a single series. Scales on head beginning behind hindmargin of eye. About 8 rows of scales before dorsal, the anterior rows consisting of somewhat smaller scales than the following. Scales on thorax between isthmus and base of pectorals and ventrals much larger than those of sides. Dorsal spines stiff and pungent, the first as long as eye, the following increasing in length, the last not quite double as long as the first. The longest dorsal ray as long as last spine. Dorsal scarcely pointed behind. First anal spine minute, third longest, equal to one eye diameter and a half. Soft anal similar to soft dorsal. Pectorals slightly shorter than head without snout. Ventrals as long as snout. Caudal rounded. Head and body bluish or violet above, light pinkish or bluish white below. A narrow light bluish band from occiput along base of dorsal to end of that fin. A similar band from hindborder of eye, along lateral line continued in a straight line to basal part of caudal rays. This band continued forward before eye on snout, where it meets that of the other side. A somewhat broader band from upper lip, along lower border of eye, over opercular flap, above base of pectoral and ending here about 6 scales behind head. On the head and on the body before pectorals this band forms the line of demarcation between the dark colour above and the light colour below, but on the rest of the body and tail this demarcation is formed by the next band, which runs from the corner of the mouth, parallel to the preceding, over the cheek, opercle and subopercle, below base of pectoral to caudal, where it is more or less produced on the base of the caudal rays. These bands are generally blue or reddish on the head in preserved specimens and pearly white on the body. On the head and anterior part of body the two lower bands are often bordered with darker above and below. Fins hyaline, the dorsal with a narrow brown edge and a median brown longitudinal stripe. Length 146 mm.

Habitat: Sumatra (Benkulen, Trussan, Padang!); Nias; Java (Prigi, Patjitan); Bawean; Bali; Celebes (Makassar, Tanawanko); Tana Keke Island; Sangi Islands; Batjan; Ambon; Haruko; Goram; Banda!; Letti; Timor!; Misol; New Guinea (Millport Harbour). — Red Sea, Madagas Region, Philippines!, Pelew Islands, New Hanover. In sea.

2. **Stethojulis renardi** (Blkr.)

Julis (*Halichoeres*) *Renardi* Bleeker, Nat. Tijdschr. Ned. Indië II, 1851, p. 253.
Stethojulis Renardi Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 291. — Atl. Ichth. I, 1862, p. 132.
Stethojulis renardi Günther, Cat. Brit. Mus. IV, 1862, p. 141. — Fische der Südsee II, Prt. 2, 1881, p. 256.
Stethojulis renardi Seale, Occas. Papers B. P. Bishop Mus. I, 1901, p. 92.
Stethojulis renardi Ogilby, Proc. Royal Soc. Queensland XXI, 1908, p. 23.
Stethojulis renardi Barnard, Ann. S. Afric. Mus. XXI, 1925—1927, p. 757.
Stethojulis renardi Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 242.
Stethojulis renardi Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 336.
Stethojulis renardi P. J. Schmidt, Bull. Acad. Sc. URSS. 1930, p. 551.
Stethojulis Renardi Chevey, Trav. Inst. Océan. de l'Indochine. 4e Mém, 1932, p. 105.

D. IX. 11 (12). A. III. 11. P. 2. 13. V. I. 5. Ll. 27—28. Ltr. $\begin{array}{c}2\\ \hline 1\\ \hline 9\end{array}$.

Height 3.3—3.4, 3.9—4 in length with caudal. Head 2.9—3, 3.4 in length with caudal. Height of head 1.6 in its length. Eye 3.7—3.8, 1.9—2.2 in snout and 1.4—1.6 in slightly convex interorbital space. Mouth small, horizontal. Maxillary not reaching to below anterior nostril. Teeth in a single row, incisiviform. A short canine at corner of mouth. Head naked. Scales beginning on occiput far behind eye. About 7—8 rows of scales before dorsal. These scales smaller than those of the sides. First row of scales immediately behind isthmus also rather small, following rows on thorax very large, larger than those of sides. Dorsal spines stiff and pungent. First spine somewhat shorter, last spine somewhat longer than eye. Longest dorsal ray not much longer than longest spine. First anal spine minute, third spine, longest, as long as eye. Soft anal similar to soft dorsal. Pectorals as long as head without snout. Ventrals equal to snout. Caudal rounded. Colour of preserved specimens reddish brown above, creamy white below. A light or dark narrow band from occiput running backwards closely below base of dorsal, another from anterior border of eye running forwards and meeting that of the other side on upper profile of snout. A pinkish band, more or less distinctly bordered by dark brown, from upper lip, closely below eye over operculum to upperpart of base of pectoral. Below it a similar band, beginning at gillopening, running to lower part of base of pectoral, and continued on sides, ending about above anus. The interspace between these bands and an area below the upper band on head, as well as above the lower band on the sides more or less conspicuously shining light cobalt or red. A dark spot above pectoral axil and another on opercular flap. A light band from hindborder of eye, running closely above the dark spots on opercle and above pectoral axil, continued to base of middle caudal rays, where it ends below a small black spot. Fins yellowish. Length 126 mm.

Habitat: Singapore; Java; Bawean; Celebes (Menado); Sangi Islands; Sulu Islands!; Ternate; Buru; Ceram; Ambon; Banda; Timor. — Mozambique, Zanzibar, Indo-China, Riu Kiu Islands, Philippines!, Queensland, Marianas. In sea.

3. **Stethojulis albovittata** (Bonn.)

Labrus albovittatus Bonnaterre, Tabl. encycl. Ichthyol. 1788, p. 108.
Labrus albovittatus Lacepède, Hist. Nat. Poissons III, 1802, p. 443, p. 509.
Julis balteatus Quoy & Gaimard, Voyage Uranie & Physicienne. Zool. 1824, p. 267.
Julis balteatus Cuvier & Valenciennes, Hist. Nat. Poissons XIII, 1839, p. 475.
Julis (Halichoeres) balteatus Bleeker, Nat. Tijdschr. Ned. Indië II, 1851, p. 253.
Stethojulis albovittata Günther, Ann. Mag. Nat. Hist. VIII, 1861, p. 386. — Cat. Brit. Mus. IV, 1862, p. 141.
Stethojulis albovittata Bleeker, Atl. Ichth. I, 1862, p. 132.
Stethojulis albovittata Günther, Fishes of Zanzibar 1866, p. 93.
Stethojulis albovittata Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 542.
Stethojulis casturi Günther, Fische der Südsee II, Prt 2, 1881, p. 255 (nec Blkr.).
Stethojulis albovittata Günther, ibid. p. 256.
Stethojulis albovittata Fowler, Proc. Acad. Nat. Sc. Philadelphia 1900, p. 508.
Stethojulis albovittata Jenkins, Bull. U. S. Fish. Comm. XXII (1902), 1904, p. 459.
Stethojulis albovittata Jordan & Evermann, ibid. XXIII (1903), 1905, p. 284.
Stethojulis casturi Jordan & Seale, Bull. Bur. Fish. XXV (1905), 1906, p. 296 (nec Blkr.).
Stethojulis casturi Snyder, Proc. U. S. Nat. Mus. XLII, 1912, p. 506 (nec Blkr.).
Stethojulis casturi M. Weber, Siboga Exp. Fische 1913, p. 368 (nec Blkr.).
Hinalea balteata Jordan & Jordan, Mem. Carnegie Mus. X, 1922—1925, p. 69.
Stethojulis albovittata Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 335.
Stethojulis casturi Fowler, ibid. p. 336 (sine syn.).

Stethojulis (*Rhytejulis*) *albovittata* Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 241.

Stethojulis casturi P. J. Schmidt, Trans. Pac. Comm. Acad. Sc. USSR. I, 1930, p. 80 (nec Blkr.).

D. IX. 11 (12). A. III. 11 (12). P. 2. 12. V. I. 5. Ll. 27. Ltr. $\begin{array}{c}2\frac{1}{2}\\ \hline 1\\ \hline 9\end{array}$.

Height 3.2—3.5, 3.8—4.3 in length with caudal. Head 3, 3.4—3.6 in length with caudal. Height of head 1.3 in its length. Eye 5.1—6.5, 1.8—2.5 in snout and 1.2—1.6 in convex interorbital space. Mouth small, horizontal. Maxillary not reaching to below anterior nostril. Teeth in a single series, incisiviform. A moderate canine at corner of mouth. Head naked, excepting above, where the scales begin behind hindborder of eye. About 8—9 rows of scales before dorsal, the anterior ones smaller than those of the sides. Scales of thorax between isthmus and base of pectorals and ventrals much larger than those of the sides. Dorsal spines stiff and pungent, the first as long as eye, following increasing in length, the last not quite double as long as the first. The longest dorsal rays as long as last spine. Dorsal pointed behind. First anal spine minute, third longest, slightly more than eye. Soft anal similar to soft dorsal. Pectorals equal to head without snout. Ventrals as long as snout. Caudal rounded. Body reddish brown above, lighter below. A narrow white band from frontborder of eye, running forwards to median line of snout, where it meets that of the other side. A similar band from upper part of hindborder of eye to occiput, continued backwards along base of dorsal, where it ends below last ray. Another similar band from hindborder of eye, along upper border of opercle and continued on 5 anterior scales of lateral line. A somewhat broader band from upper lip, touching lower border of eye, running over opercle and opercular flap, somewhat deflected before base of pectorals and ending above anus. In the typical *albovittatus* this band is not deflected and runs along sides to or on caudal, but I have not seen specimens from the Indo-australian region where this is the case. A band, similar to the preceding, from corner of mouth, over cheek, opercle and subopercle, then running upwards along hindborder of subopercle to base of pectoral, continued behind base of pectoral to or on caudal rays. In the typical *albovittata* mentioned above, where the preceding band runs also on the caudal, this last band runs to and on lower caudal rays. The space between this band and the preceding white (red in life). Fins yellowish. Length 133 mm.

Habitat: Sumatra (Trussan); Nias; Batu Islands; Java (Karangbollong, Prigi); Bali!; Celebes (Menado); Sangi Islands; Sulu Islands; Karkaralong!; Binongka!; Ternate; Buru; Ceram; Banda!; Goram; Letti; Timor!; Rotti!; New Guinea (South East Coast). — Red Sea, Zanzibar, Madagascar, Mauritius, Riu Kiu Islands, Philippines, Queensland, Pelew Islands, Marcus Island; New Hebrides; Marshall Islands, Ellice Islands, Fiji, Ponapé, Samoa, Hawaii, Rarotonga. In sea.

Note. This species occurs in two colour varieties, as mentioned above and which have been described by Günther 1881 l.c. as two species, *S. albovittata* and *S. casturi*. Most American ichthyologists and also M. Weber have followed Günther, on the presumption that the two forms are geographically separated. *S. albovittata* has been considered as occurring only at Hawaii, whereas *S. casturi* has a large range. This however is not the case. Günther mentions already specimens of *S. albovittata* from Madagascar and Zanzibar and before him Klunzinger l.c. described a specimen from the Red Sea, which certainly belongs to *albovittata* and not to *casturi*, for Klunzinger says: "Der 3. (Streife) zieht vom Mundwinkel unter dem Auge hin durch die Spitze des Deckenlappens und über die Basis der Brustflosse zur Basis der Schwanzflosse (in Bleeker's Figur ist sie kürzer)". Typical *albovittata* are therefore known from the western part of its range: the Red Sea, Madagascar, Zanzibar, and again from the eastern part: New Hebrides, Marcus Island, Fiji, Hawaii. The variety *casturi* occurs apparently in the whole range and is the only one known from the Indo-australian Archipelago. Although it looks as if the two varieties are rather sharply defined, I find among my material from the Indo-australian Archipelago a specimen from Banda, which corresponds to Günther's *casturi* but where there are *two* white bands on the caudal fin, the intermediate space being dark. Therefore, and on account of the geographical distribution, I provisionally consider them as two colour varieties of one species.

If the two are considered as different species it must be noticed that the name *casturi* Gthr. has to be replaced by a new name, as it is preoccupied by *Julis casturi* Blkr., which is a synonym of *Stethojulis trilineata* (Bl. Schn.).

4. **Stethojulis interrupta** (Blkr.)

Julis (*Halichoeres*) *interruptus* Bleeker, Nat. Tijdschr. Ned. Indië II, 1851, p. 252.

Stethojulis interrupta Günther, Ann. Mag. Nat. Hist. VIII, 1861, p. 386. — Cat. Brit. Mus. IV, 1862, p. 142.
Stethojulis interrupta Bleeker, Atl. Ichth. I, 1862, p. 133.
Stethojulis interrupta Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 543.
Stethojulis interrupta Jordan & Seale, Proc. U. S. Nat. Mus. XXIX, 1905, p. 524.
Stethojulis interrupta Barnard, Ann. S. Afric. Mus. XXI, 1925—1927, p. 756.
Stethojulis interrupta Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 335.
Stethojulis interrupta Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 240.
Stethojulis interrupta Fowler, Hongkong Naturalist II, 1931, p. 306.

D. IX. 11 (12). A. III. 11 (12). P. 2. 11—12. V. I. 5. Ll. 27—28.

Ltr. $\begin{array}{c}2\\ \hline 1\\ \hline 8\text{—}9\end{array}$.

Height 3.4—3.8, 4—4.5 in length with caudal. Head 2.8—3, 3.3—3.6 in length with caudal. Height of head 1.6 in its length. Eye 5.3—6, twice in snout and 1.1—1.3 in nearly flat interorbital space. Mouth small, horizontal. Maxillary by far not reaching to below anterior nostril. A well developed canine at corner of mouth. Teeth in jaws in a single series, incisiviform. Head naked, excepting above, where the scales begin at some distance behind eye. About 10 rows of scales before dorsal. These scales smaller than those of the sides. Scales immediately behind isthmus also small, but the following scales on thorax large, slightly larger than those of sides of body. Dorsal spines stiff and pungent, the first shorter than eye, the last about one half diameter of eye longer than eye. Longest dorsal rays slightly longer than last spine. First anal spine half as long as second, third longest, somewhat longer than eye. Longest anal rays almost twice as long as eye. Pectorals as long as head without snout, ventrals as long as snout. Colour of preserved specimens reddish brown above, creamy below. A chalky white or bluish narrow band beginning on scaly part of occiput and running closely below base of dorsal to upper caudal rays. A similar band from upper part of frontborder of eye, running forward and somewhat upward, meeting that of the other side on the median line of the snout. Another band from middle of upper lip, closely below eye to end of preopercle. Also a band from hindborder of eye to superior border of operculum. A short band from gillopening to upper base of pectoral, where it ends in a dark brown blotch. Below a second band running parallel to it, from gillopening to lower base of pectoral, generally interrupted here, but continued about 9 or 10 scales further and ending on sub-median caudal rays. Fins creamy. Length 130 mm.

Habitat: Singapore; Bali!; Celebes (Menado); Sangi Islands; Sulu Islands!; Solor; Flores!; Timor; Rotti; Ternate; Buru; Ambon!; Ceram; Banda!; New Guinea (South Coast). — Coast of Natal, Zanzibar, Red Sea, Annam, Philippines, China. In sea.

5. **Stethojulis strigiventer** (Benn.)

Julis strigiventer Bennett, Proc. Zool. Soc. London 1832, p. 184.
Julis strigiventer Cuvier & Valenciennes, Hist. Nat. Poissons XIII, 1839, p. 468.
Julis (*Halichoeres*) *strigiventer* Bleeker, Nat. Tijdschr. Ned. Indië II, 1851, p. 251.
Stethojulis strigiventer Günther, Ann. Mag. Nat. Hist. VIII, 1861, p. 386. — Cat. Brit. Mus. IV, 1862, p. 140.
Stethojulis strigiventer Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 291. — Atl. Ichth. I, 1862, p. 135.
Stethojulis strigiventer Kner, Novara Exp. Fische, 1865, p. 252.
Stethojulis strigiventer Günther, Fishes of Zanzibar 1866, p. 92. — Fische der Südsee II, Prt 2, 1881, p. 254.
Stethojulis strigiventer Day, Fishes of India, Part III, 1877, p. 397.
Stethojulis strigiventer Jordan & Snyder, Proc. U. S. Nat. Mus. XXIV, (1901), 1902, p. 631.
Stethojulis strigiventer Snyder, ibid. XLII, 1912, p. 420.
Stethojulis strigiventer Barnard, Ann. S. Afric. Mus. XXI, 1925—1927, p. 757.
Stethojulis strigiventer Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 232.
Stethojulis strigiventer Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 333.
Stethojulis strigiventer Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 306.
Stethojulis strigiventer Fowler, Acad. Nat. Sc. Philadelphia, Monogr. 2, 1938, p. 175.

D. IX. 11. A. III. 11. P. 2.13 1). V. I. 5. Ll. 27. Ltr. $\begin{array}{c} 2\frac{1}{2} \\ \hline 1 \\ \hline 9 \end{array}$.

Height 3.5—3.6, 4—4.2 in length with caudal. Head 2.9—3, 3.4—3.5 in length with caudal. Height of head 1.5 in its length. Eye 5.1—5.5, 1.7—1.8 in snout and 1.2—1.3 in almost flat interorbital space. Mouth horizontal, moderate. Maxillary not reaching to below anterior nostril. Teeth incisiviform. A moderate canine at corner of mouth. Head naked, excepting above, where the scales begin slightly behind vertical through hindborder of eye. About 9—10 rows of scales before dorsal, these scales much smaller than those of sides. Scales of thorax somewhat larger than those of sides. Dorsal spines stiff and pungent, first somewhat less, last spine somewhat more than eye. Soft dorsal slightly higher than

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1) Rarely 2.12 or 2.14.

spinous part. First anal spine minute, third longest, equal to eye. Soft anal similar to soft dorsal. Caudal rounded. Pectorals as long as head without snout. Ventrals somewhat more than length of snout. Colour of preserved specimens reddish brown above, lighter below, more or less silvery on lower half of head, where the two colours are sharply defined and separated by a silvery band which runs from snout, touching lower border of eye, to upper extremity of subopercle. Scales of upper part of sides with faint silvery spots, getting more distinct and fusing into silvery longitudinal bands below, about 5 of these bands, beginning on thorax and ending on caudal peduncle or above anal. Some of the scales on sides often with a small dark brown point. Pre- and postorbital region sometimes with fine whitish anastomosing lines, forming a meshwork, which may extend on the sides. Fins hyaline. A brown spot on last rays of dorsal, and sometimes also on last rays of anal in young specimens. Caudal with brown cross bars. A brown spot at base of supra-median rays. Length 109 mm.

Habitat: Singapore; Lepar; Biliton; Bawean; Celebes (Menado); Basa Reef, Gulf of Boni; Sarangan Island; Sulu Islands!; Rotti!; Timor; Ternate; Buru!; Ceram; Ambon; Banda; Kei Islands; New Guinea (South East Coast). — Mozambique, Zanzibar, Mauritius, Seychelles, Andamans, Nicobars, China, Japan, Riu Kiu Islands, Philippines, Pelew Islands, Marshall Islands, Carolines, Fiji, Samoa, Tonga Islands, Society Islands, Paumotu Islands. In sea.

6. **Stethojulis phekadopleura** (Blkr.)

Julis (Halichoeres) phekadopleura Bleeker, Verh. Bat. Gen. XXII, 1849. Bijdr. ichth. Bali, p. 8.

Stethojulis phekadopleura Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 290. — Atl. Ichth. I, 1862, p. 134.

Stethojulis phekadopleura Günther, Cat. Brit. Mus. IV, 1862, p. 143. — Fische der Südsee II, Prt. 2, 1881, p. 255.

Stethojulis phekadopleura Jordan & Seale, Bull. Bur. Fish. XXV, (1905) 1906, p. 297.

Stethojulis phekadopleura Jordan & Richardson, ibid. XXVII, (1907) 1908, p. 265.

Stethojulis phekadopleura Fowler & Bean, Bull. U. S. Nat. Mus. 100, Vol. VII, 1928, p. 237.

Stethojulis phekadopleura Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 335.

Stethojulis phekadopleura P. J. Schmidt, Trans. Pac. Comm. Acad. Sc. USSR. 1930, p. 80.

D. IX. 11. A. III. 11. P. 2. 11. V. I. 5. Ll. 27—28. Ltr. $\begin{array}{c}2\frac{1}{2}\\ \hline 1\\ \hline 9\end{array}$.

Height 3—3.3, 3.5—4 in length with caudal. Head 3.1—3.3, 3.7—4 in length with caudal. Height of head 1.2—1.3 in its length. Eye 3.8—5.2, 1.5—2 in snout and 1.2 in almost flat interorbital space. Mouth small, horizontal. Maxillary not reaching to below anterior nostril. Teeth in a single row, incisiviform. A short canine at corner of mouth. Head naked, excepting above, where the scales begin above hindborder of eye. Eight to ten series of scales before dorsal, these scales somewhat smaller than those of sides. Scales of thorax larger than those of sides. Dorsal spines stiff and pungent. First spine slightly shorter than eye, last spine almost twice diameter of eye. First anal spine minute, third longest, not quite one eye diameter and a half. Soft anal similar to soft dorsal. Pectorals equal to head without snout, ventrals equal to snout. Caudal rounded. Colour of preserved specimens: Vinous red above, creamy below, the two colours sharply defined and separated by a lighter band, not very conspicuous on body, but more so on head, which is darker than the body. Often a narrow line below eye, separating the dark upper parts from the light band. The dark upper parts closely freckled with light spots, more or less arranged into longitudinal rows, those on head generally smaller and more crowded than on body. On the light lower parts the scales of two or three longitudinal rows between ventrals and end of anal have each a brown blotch. A large but faint brown spot at end of lateral line, not always present. Dorsal more or less freckled with white, other fins hyaline or light yellowish. Length 119 mm. (Specimens of Bleeker's collection in the Amsterdam Museum examined).

Habitat: Sumatra (Kauer, Trussan, Ulakan, Padang); Simalur!; Nias!; Java (Karangbollong, Patjitan, Prigi); Bawean; Borneo; Bali!; Celebes (Makassar, Menado); Sangi Islands; Talaut Islands!; Saleyer!; Buru; Ceram; Ternate; Obi Major!; Ambon; Nusa Laut!; Flores!; Savu!; Letti; Timor; Tiur!; Aru Islands!; New Guinea (South Coast). — Natal Coast, Riu Kiu Islands, Japan, Philippines!, Solomon Islands, New Hebrides, Carolines, Fiji, Rotuma, Samoa. In sea.

7. **Stethojulis kalosoma** (Blkr.)

Julis (*Halichoeres*) *kalosoma* Bleeker, Nat. Tijdschr. Ned. Indië III, 1852, p. 289.

Stethojulis kallosoma Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 290. — Atl. Ichth. I, 1862, p. 134.

Stethojulis kalosoma Günther, Cat. Brit. Mus. IV, 1862, p. 142. — Fishes of Zanzibar 1866, p. 94.
Stethojulis kalosoma Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 543.
Stethojulis terina Jordan & Snyder, Proc. U. S. Nat. Mus. XXIV, (1901) 1902, p. 631.
Stethojulis zatima Jordan & Seale, ibid. XXVIII, 1905, p. 788.
Stethojulis kalosoma Jordan & Seale, Bull. Bur. Fish. XXVI, (1906) 1907, p. 30.
Stethojulis kalosoma Snyder, Proc. U. S. Nat. Mus. XLII, 1912, p. 420.
Stethojulis kallosoma M. Weber, Siboga Exp. Fische 1913, p. 369.
Stethojulis kalosoma Jordan, Tanaka & Snyder, Journ. Coll. Sc. Univ. Tokyo XXXIII. Art. I, 1913, p. 200.
Stethojulis terina Jordan & Hubbs, Mem. Carnegie Mus. X, 1922—1925, p. 250.
Stethojulis kallosoma Barnard, Ann. S. Afric. Mus. XXI, 1925—1927, p. 758.
Stethojulis kalosoma Fowler & Bean, Bull. U. S. Nat. Mus. 100, Vol. VII, 1928, p. 238.
Stethojulis kalosoma Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 335.

D. IX. 11 (12). A. III. 11 (12). P. 2. 11. V. I. 5. Ll. 27.
Ltr. $\begin{array}{c}2-2\frac{1}{2}\\ \hline 1\\ \hline 8-9\end{array}$.

Height 4—4.3, 4.7—5.3 in length with caudal. Head 3—3.3, 3.6—3.8 in length with caudal. Height of head 1.5—1.7 in its length. Eye 4.5—6, 1.4—2.1 in snout and 1—1.4 in almost flat interorbital space. Mouth small, horizontal. Maxillary not reaching to below anterior nostril. Teeth in a single row, incisiviform. A short canine at corner of mouth. Head naked, excepting above, where the scales begin slightly behind hindborder of eye. Ten to twelve rows of scales before dorsal; these scales much smaller than those of sides of body. Scales of thorax larger than those of sides, the anterior row, immediately behind isthmus however much smaller. Dorsal spines stiff and pungent. First dorsal spine shorter than eye, last spine one eye diameter and a half or nearly twice eye. Soft dorsal scarcely higher than posterior part of spinous dorsal, longest rays about twice eye. First anal spine minute, third longest, somewhat more than one eye diameter. Soft anal similar to soft dorsal. Pectorals equal to head without snout, ventrals equal to snout. Caudal rounded. Colour of preserved specimens brownish red above, silvery, creamy or light brown below, the colours sharply separated, sometimes by an indication of a dark longitudinal band, which may be more distinct above pectoral and bordered above and below by a narrow shining white stripe. This band may be continued on opercle and reaching to eye. The lower white border is also continued on head and is often present in cases where the dark band is indistinct. This white band runs from above corner of mouth to upper base of pectoral and beyond. An indistinct light band from above or before eye along lateral line, disappearing below posterior part of soft dorsal. Scales of lower half of body with rows of larger and smaller brown spots, often encircled by silvery and forming ocelli. Dorsal dusky brown, in young specimens often a cloudy brown spot on posterior rays. Other fins hyaline or creamy. A dark spot just above end of lateral line may be present in young specimens. Length 126 mm. (A specimen of Bleeker's collection in the Amsterdam Museum examined).

Habitat: Sumatra (Priaman); Nias!; Java (Prigi, Karangbollong, Patjitan); Bawean; Bali!; Sarassa!; Saleyer!; Celebes (Menado); Sangi Islands; Sulu Islands!; Ternate; Buru; Ceram; Ambon; Goram; Banda; Flores!; Solor; Timor; Kei Islands!; New Guinea (South East Coast). — Natal Coast, Madagascar, Zanzibar, Red Sea, Japan, China, Indochina, Philippines, Queensland. In sea.

Note. This species is very close to *S. phekadopleura*. Young specimens of both species are hardly distinguishable.

8. **Stethojulis axillaris** (Q. G.). (Fig. 28, p. 155)

Julis axillaris Quoy & Gaimard, Voyage Uranie, Zool. 1824, p. 272.
Julis (Halichoeres) bandanensis Bleeker, Nat. Tijdschr. Ned. Indië II, 1851, p. 254.
Stethojulis axillaris Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 290. — Atl. Ichth. I, 1862, p. 136.
Stethojulis axillaris Günther, Cat. Brit. Mus. IV, 1862, p. 142. — Fishes of Zanzibar 1866, p. 93. — Fische der Südsee II, Prt. 2, 1881, p. 254.
Stethojulis axillaris Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 541.
Stethojulis axillaris Jenkins, Bull. U. S. Fish. Comm. XXII, (1902) 1904, p. 459.
Stethojulis axillaris Jordan & Evermann, ibid. (1903) 1905, p. 283.
Stethojulis axillaris Jordan & Seale, Bull. Bur. Fish. XXV, (1905) 1906, p. 297.
Stethojulis bandanensis Jordan & Seale, l.c. — ibid. XXVI, (1906) 1907, p. 30.
Stethojulis bandanensis Jordan & Richardson, ibid. XXVII, (1907) 1908, p. 266.
Stethojulis axillaris Snyder, Proc. U. S. Nat. Mus. XLII, 1912, p. 506.
Stethojulis axillaris M. Weber, Siboga Exp. Fische 1913, p. 369.
Hinalea axillaris Whitley, Rec. Austr. Mus. XVI, 1927, p. 25.
Stethojulis axillaris Fowler & Bean, Bull. U. S. Nat. Mus. 100, Vol. VII, 1928, p. 234.
Stethojulis axillaris Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 334.
Hinalea axillaris McCulloch, Checklist Fish. Austr. Part II, 1929, p. 315.
Stethojulis axillaris J. P. Schmidt, Trans. Pac. Comm. Acad. Sc. USSR. I, 1930, p. 81.
Stethojulis axillaris Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 305.

Stethojulis axillaris Fowler, Acad. Nat. Sc. Philadelphia, Monogr. 2, 1938, p. 133.

D. IX. 11. A (II) III. 10 (11). P. 2. 12. V. I. 5. Ll. 26—27.
Ltr. $\begin{array}{c}2\frac{1}{2}\\ \hline 1\\ \hline 9\end{array}$.

Height 3.1—3.2, 3.6—3.8 in length with caudal. Head 2.9—3.1, 3.4—3.6 in length with caudal. Height of head 1.3—1.4 in its length. Eye 5.7—6, less than rather convex interorbital space and 2—2.5 in snout. Mouth small, horizontal. Maxillary not reaching to below anterior nostril. Teeth in a single row, incisiviform. A short canine at corner of mouth. Head naked, excepting above, where the scales begin behind eye. About 8 rows of scales before dorsal; these scales slightly smaller than those of the sides. Dorsal spines slender, but stiff and pungent. First spine less than eye, last one eye diameter and a half. Longest dorsal rays not much longer than longest spines. Dorsal pointed behind. Last anal spine about equal to eye. Soft anal similar to soft dorsal. Pectorals equal to head without snout or somewhat longer. Ventrals equal to snout. Caudal rounded. Colour of preserved specimens brownish red above, densely freckled with small light spots; silvery below. Scales of the sides and belly often with a greyish centre. A triangular creamy spot (yellow in life) above axil of pectoral. A light band from snout along upper margin of eye, following lateral line and ending below end of dorsal. Another somewhat broader band from corner of mouth, along lower border of eye, through triangular spot above base of pectoral to base of median caudal rays. The interspace between these bands sometimes darker, forming a broad dark band from snout through eye to caudal. This band and the light bands often obsolete. Generally two dark, white edged ocelli in a longitudinal line on posterior part of caudal peduncle, sometimes three or only one, or two on one side and three on the other. Fins hyaline or dusky, dorsal powdered with dark red. Length 118 mm. (Specimens of Bleeker's collection in the Amsterdam Museum examined).

Habitat: Singapore; Java (Karangbollong); Bali!; Celebes (Menado, Tombariri); Siau!; Sangi Islands; Talaut Islands!; Binongka!; Flores!; Buru; Ambon; Nusa Laut!; Ternate; Banda!; Goram; Kei Islands!; Roma!; Timor!; Rotti!; New Guinea (Pitt Bay). — Madagascar, Zanzibar, Red Sea, Réunion, Japan, Riu Kiu Islands, Philippines, Pelew Islands, Carolines, Solomon Islands, New Hebrides, Lord Howe Island, North Queensland, Marshall

Islands, Ellice Islands, Fiji, Samoa, Hawaii, Paumotu Islands. In sea, on reefs.

Note. Some American authors are of opinion, that *S. bandanensis* Blkr. can be separated from *axillaris*. Bleeker however (Atl. Ichth. l. c.) says that he compared his *bandanensis* with the type of *axillaris* in the Paris Museum and found them to be the same.

25. **Xenojulis** De Beaufort

(De Beaufort, Philip. Journ. of Sc. LXIX, N° 4, 1939, p. 415)

Oblong, compressed. Body covered with large scales, those on thorax not smaller than those of sides. Head naked, only a few scales before dorsal. Preopercle smooth. A single series of curved teeth in the jaws, the anterior caniniform, but not flared outwards.

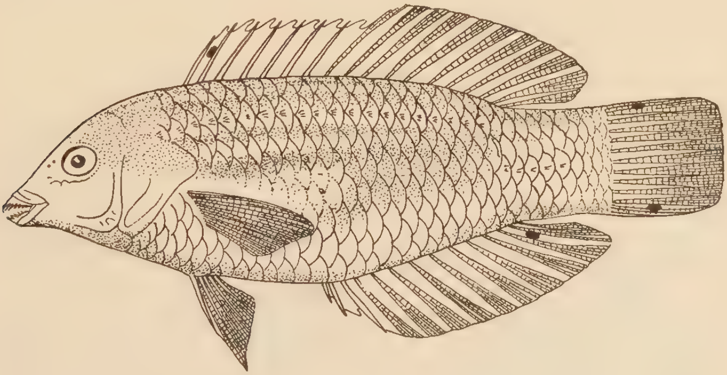

Fig. 29. *Xenojulis margaritaceus* (Macleay). Type of the species. n. s.

Posterior canine present. Dorsal consisting of IX (or VII) spines and 11 soft rays. Anal with III spines, the last of which is longest, and 11 soft rays. Pectorals truncate, the upper edge rounded. Ventrals pointed. Caudal truncate. No scaly sheath to dorsal or anal fins. Lower pharyngeals concave behind, the dentition consisting of three irregular rows of small conical teeth, those of the posterior row larger, and the median tooth of this row much larger than the others.

Distribution: New Guinea, Philippines.

1. **Xenojulis margaritaceus** (Macleay). (Fig. 29, p. 169) Fig. 30, p. 170)

Platyglossus margaritaceus Macleay, Proc. Linn. Soc. New S. Wales VIII, 1883, p. 274 (nec C. V.).
Halichoeres macleayi Jordan & Seale, Bull. U. S. Bur. Fish XXV (1905), 1906, p. 303.
Halichoeres macleayi Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 342.
Platyglossus margaritaceus Whitley, Rec. Austr. Mus. X, 1939, p. 274.
Xenojulis margaritaceus de Beaufort, Philip. Journ. of Sc. LXIX, N° 4, 1939, p. 415.

D. IX (VII). 11. A. III. 11. P. 2. 11. V. I. 5. Ll. 28—29.

Ltr. $\begin{array}{c}2\\\hline 1\\\hline 7\text{—}8\end{array}$.

Head subequal to height, 2.8—3.1, 3.6—3.7 in length with caudal. Eye about 4, 1.3—1.5 in snout. Mouth small. Corner of mouth before anterior nostril. Dorsal spines gradually increasing in length posteriorly, the last one somewhat more than snout. Membranes between the spines incised. Each spine, and specially the four anterior ones, with a streamer like prolongation. Third anal spine as long as last dorsal one. Soft dorsal and anal similar, deeper than spinous part. Colour of preserved specimens yellowish, darker on the top of the head, with a well marked large pearly area on middle of sides, or with indistinct greyish transverse bars, more or less edged with black. Scale rows on body sometimes tend to form diffuse dark longitudinal bands. Traces of a pearly marking on opercle. Fins yellow. A small black spot between first and second,

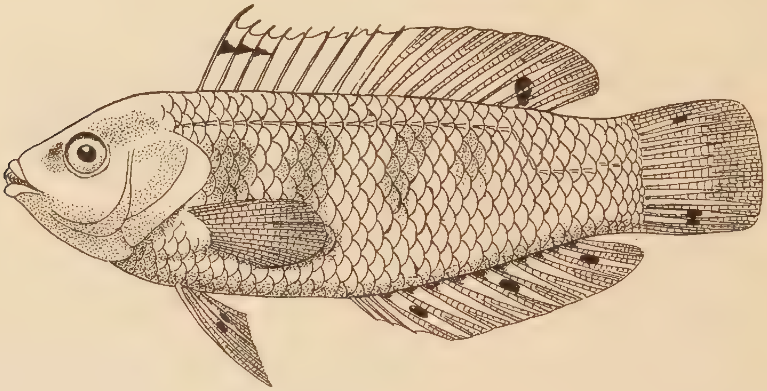

Fig. 30. *Xenojulis margaritaceus* (Macleay). × $1^1/_3$
Specimen from the Philippines

and sometimes also between second and third and third and fourth dorsal spines, between the 9th and 10th anal rays and on the middle of the uppermost and lowest caudal rays. A dark ocellus may be present at base of 8th—9th dorsal rays and also a black spot between first and second and fifth and sixth anal rays. A spot between the first to third ventral rays may also be present. Length 95 mm.

Habitat: New Guinea (Hood Bay). — Philippines!

Note. The type of the species has only seven dorsal spines. No other specimens are known, but among a collection of fishes from the Philippines I found a fish, which probably belongs to this species, but which has nine dorsal spines. In my paper cited above I have explained, why I consider the occurrence of seven spines as an abnormality.

26. **Macropharyngodon** Bleeker

(Bleeker, Proc. Zool. Soc. London 1861, p. 412)

Oblong, very compressed. Head rather deep. Snout pointed. Body covered with large scales; those before dorsal and behind isthmus much smaller than the others. Lateral line complete, but with a sharp bent downwards below soft dorsal. Head naked, scales beginning above with a few rows only before dorsal, far behind vertical through hindborder of eye. Preopercle smooth. Teeth in a single row in the jaws, pointed. There are four caniniform teeth anteriorly in the upper and the lower jaw; the posterior ones in the upper jaw curved, with their points turned backwards. A canine at

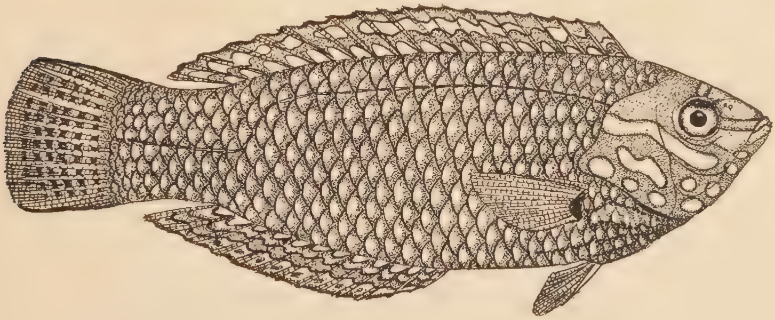

Fig. 31. *Macropharyngodon meleagris* (C. V.). n. s.

corner of mouth. Dorsal consisting of IX spines and 11 soft rays. Anal with III spines and 11 rays. Pectorals rounded. Ventrals pointed, the first ray sometimes produced. Caudal rounded. Gill-membranes united to each other and to isthmus. Pharyngealia inferiora with only three teeth, the middle one a large concave molar.

Distribution: Three or four species have been described from the subtropical and tropical parts of the Pacific, ranging from the Riu Kiu Islands to Hawaii. Perhaps they are only varieties of a single species. As I have shown elsewhere (Bijdr. Dierkunde Afl. 27, 1939, p. 16) *Leptojulis pardalis* Kner belongs to this genus.

1. **Macropharyngodon meleagris** (C. V.). (Fig. 31, p. 171)

Julis meleagris Cuvier & Valenciennes, Hist. Nat. Poissons XIII, 1839, p. 481.
Julis (*Halichoeres*) *Geoffroyi* Bleeker, Acta Soc. Sc. Indo-Neerl. I, 1856. Beschr. visch. Manado, p. 58 (nec Q. G.).
Macropharyngodon Geoffroyi Bleeker, Proc. Zool. Soc. London 1861, p. 412. — Versl. Akad. Amsterdam XIII, 1862, p. 289. — Atl. Ichth. I, 1862, p. 129 (nec Q. G.).
Platyglossus geoffroyi Günther, Cat. Brit. Mus. IV, 1862, p. 145 (nec Q. G.).
Macropharyngodon meleagris Jordan & Seale, Bull. Bur. Fish. XXV, (1905) 1906, p. 298.
Macropharyngodon meleagris Günther, Fische der Südsee III, 1909, p. 262.
Platyglossus meleagris M. Weber, Siboga Exp. Fische 1913, p. 376.
Macropharyngodon geoffroyi Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 299.
Halichoeres meleagris P. J. Schmidt, Trans. Pac. Comm. Acad. Sc. USSR. I, 1930, p. 83.

D. IX. 11 (12). A. III. 11. P. 2. 10. V. I. 5. Ll. 29. Ltr. $\begin{array}{c}2\frac{1}{2}\\\hline 1\\\hline 9\end{array}$.

Height 2.9, 3.5 in length with caudal. Head 3.3, 4 in length with caudal. Height of head 1.1 in its length. Eye 5, 1.6 in snout and 1.2 in convex interorbital space. Mouth small, horizontal. Maxillary not reaching to below anterior nostril. Teeth pointed, the anterior two in the upper jaw and the anterior four in the lower jaw long slender canines, directed obliquely forwards. The next tooth in the upper jaw strongly curved, the point directed somewhat backwards. Head entirely naked, only a few scales before dorsal; these scales smaller than those of the body. Similar small scales behind isthmus. Dorsal spines pungent, with a fleshy prolongation. First spine equal to eye, last equal to snout. Soft dorsal not higher than spinous part, somewhat pointed behind. First anal spine minute, third longest, slightly shorter than snout. Soft anal similar to soft dorsal. Pectorals equal to postorbital part of head (with opercular flap), ventrals without produced rays slightly more than snout and eye together. Caudal rounded. Head light pinkish, with a violet hue and with yellowish or light orange bands and large spots, each band and spot edged narrowly with brown. One band from corner of mouth to eye. Chin and lower part of cheeks with spots. A few bands connecting eyes over interorbital space. Below eye a band running obliquely upwards over preopercle and then horizontally over opercle, continued on anterior scales of body, the brown edges of this band forming two longitudinal stripes on each scale. Below this band short bands and spots, more or less distinctly continued on scales of anterior part of body. Posteriorly the brown on the scales increases, leaving only the posterior part of the scale light, giving to the body a spotted or a more or less reticulated aspect. Thorax with longitudinal bands, as those of the head. A bluish black diffuse patch at isthmus. Dorsal and anal light violet, with a narrow subterminal brown line and an undulated band in the middle, with a narrow upper and lower brown edging. This band broken into a row of spots or brown circles on the anterior part of the dorsal. A black, white edged patch between the first to third dorsal spines. At the base of both dorsal and anal a row of brown semi circles, one between each undulation of the median band. Caudal hyaline, the rays yellowish, with about 7 cross bars, each bar consisting of a double narrow brown line. Pectorals light, with a dark brown patch along their bases. Ventrals light, with some dark markings. Length 144 mm.

Habitat: Celebes (Menado); Ambon; Kei Islands!; New Guinea (Hood Bay). — Riu Kiu Islands, Philippines, Solomon Islands, Carolines, Duke of York Island, Ponapé, Hawaii. In sea.

27. **Pseudojulis** Bleeker

(Bleeker, Proc. Zool. Soc. London 1861, p. 412)

Elongate. Body covered with large scales, those of thorax slightly smaller than those of the body. Head naked. Teeth conical, in a single series in the jaws. Two canines anteriorly in each jaw. No canines at corner of mouth. Lateral line not interrupted, with a sharp bent downwards before caudal peduncle. Vertical fins without scaly sheath. Dorsal consisting of IX spines and 11—13 soft rays. Anal with III spines and 11—13 soft rays. Pectorals short, somewhat rounded. Ventrals short, without produced rays. Caudal truncate or somewhat rounded. Gillmembranes united to isthmus.

Distribution: Pacific, from Molluccas, Australia, Pacific Islands to coast of North America. Small fishes, living in rockpools and on reefs.

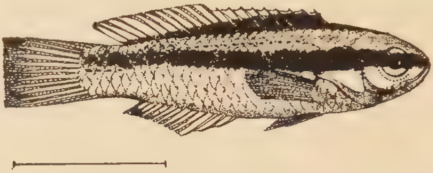

Fig. 32. *Pseudojulis trifasciatus* M. Web. × 2

Key to the Indo-australian species of Pseudojulis

1. A dark band from head to caudal, bent upwards above eye and joining that of the other side on top of head . . . . 1. *P. girardi* p. 174.
2. A dark band from head to caudal, running straight on head, through eye to tip of snout. A second median dark band from between eyes along base, and on inferior part of dorsal . . . 2. *P. trifasciatus* p. 175.

1. **Pseudojulis girardi** (Blkr.)

Julis (*Julis*) *Girardi* Bleeker, Nat. Tijdschr. Ned. Indië XVII, 1858—1859, p. 168.
Pseudojulis Girardi Bleeker, Proc. Zool. Soc. London 1861, p. 412. — Versl. Akad. Amsterdam XIII, 1862, p. 289. — Atl. Ichth. I, 1862, p. 127.
Pseudojulis girardi Elera, Cat. Fauna Filip. I, 1895, p. 554.
Pseudojulis girardi Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 188.

D. IX. 11 (12). A. III. 11 (12). V. I. 5. Ll. 27—28.

Height 4.2, 4.8 in length with caudal. Head 3.1, 3.5 in length with caudal. Height of head 1.6 in its length. Eye 4.6, more than interorbital space and 1.2 in snout. Mouth moderate, horizontal. Teeth conical, in a single series, decreasing in length posteriorly. Two canines anteriorly in each jaw. Dorsal spines stiff and pungent, the first less than eye, the last more than eye. Soft dorsal higher than spinous part. Third anal spine about as long as eye. Soft anal similar to soft dorsal. Pectorals somewhat more than postorbital part of head, ventrals slightly more than snout. Caudal rounded. Colour darker above, lighter below. A dark violet brown band from interorbital space, along hindborder of eye, above axil of pectoral, which has a triangular black spot, to base of median caudal rays. Dorsal and pectorals pinkish, ventrals and anal yellowish, caudal bluish and pinkish. Length 82 mm. (After Bleeker, not seen by me).

Habitat: Bali. — Philippines?. In sea.

Note. The type and only specimen described is not in the collection of the Leiden Museum. Elera recorded this species from the Philippines, but Fowler & Bean say that the record is of doubtful status.

2. **Pseudojulis trifasciatus** M. Weber. (Fig. 32, p. 174)

Pseudojulis trifasciatus M. Weber, Siboga Exp. Fische 1913, p. 380.

D. IX. 12. A. III. 10. P. 2. 10. V. I. 5. Ll. 27. Ltr. $\begin{array}{c}2\frac{1}{2}\\ \hline 1\\ \hline 9\end{array}$.

Height 3.8, 4.8 in length with caudal. Head 3.3, 4.1 in length with caudal. Height of head 1.6 in its length. Eye 3.5, about equal to snout and to interorbital space. Mouth oblique, before vertical through frontborder of eye. Two canines anteriorly in each jaw, followed by smaller teeth, which decrease in size posteriorly. Scales of thorax slightly smaller than the others. First dorsal spine less than eye, last spine more than eye, about equal to third anal spine. Soft dorsal higher than spinous part and similar to soft anal. Pectorals somewhat less than head without snout. Ventrals about equal to snout and eye together. Caudal truncate. Colour of preserved specimens whitish, more or less silvery, with a brown band from snout through eye to base of caudal and another median one, beginning before eyes, and running along base of dorsal almost to the end of that fin. The brown colour spreads also on the dorsal fin, the brown part of that fin decreasing gradually in depth posteriorly. Other fins hyaline. Length 29 mm. (Type in the Amsterdam Museum examined).

Habitat: Karkaralong Islands!; Nusa Laut!; Tiur!. On reefs.

28. **Halichoeres** Rüppell

(Rüppell, Neue Wirbelth. Fische 1835, p. 10)

Platyglossus Bleeker 1), Proc. Zool. Soc. London 1861, p. 411.
Güntheria Bleeker, ibid. p. 413.
Hemitautoga Bleeker, l. c.
Leptojulis Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 100.
Iridio Jordan & Evermann, Rep. U. S. Fish Comm. (1895), 1896, p. 412.
Octocynodon Fowler, Journ. Acad. Nat. Sc. Philadelphia (2) XII, 1904, p. 535.

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1) After *Platiglossus* Klein, Neuer Schauplatz III, 1776, p. 350, non binomical. See Jordan, Genera of Fishes I, 1917, p. 34.

Oblong or elongate, compressed. Body covered with large scales, those before dorsal and on isthmus much smaller, more elongate and sometimes embedded in the skin. About 25—30 scales in the lateral line, which is complete, and with a bent downwards below the soft dorsal. Head naked or with a few scales above opercle and behind and below eye. Scales beginning slightly behind or above hindborder of eye. Preopercle smooth. Teeth in a single row in the jaws, excepting minute teeth on the lingual sides of both jaws. Anterior teeth in both jaws canines. A canine superiorly at corner of mouth. Lips rather thick, plated, the inner plate crenulated. Dorsal consisting of IX spines and 11—14 soft rays. Anal with III spines, and 10—14 rays. Pectorals rounded. Ventrals pointed, the first ray sometimes produced. Caudal rounded. Gillmembranes united to each other and to isthmus.

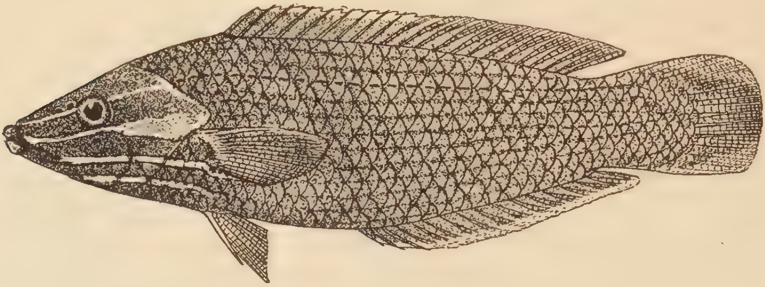

Fig. 33. *Halichoeres leucurus* (Walb.). × $^{8}/_{9}$

Distribution: Living on coral reefs and on rocky coasts among kelp, in the tropical and subtropical parts of Indic, Pacific and East Atlantic.

Key to the Indo-australian species of Halichoeres

I. Four very slender, long, distant canines in both jaws, the outer pair bent backwards and outwards. The inner pair in the lower jaw shorter than the others. Height 3.9—4.1. (*Leptojulis*) . . . . . . 1. *H. cyanopleura* p. 183.

II. Two canines anteriorly in each jaw, or 4 canines in the upper and 2 in the lower jaw. These canines rather crowded and never very long and slender.

  A. A small patch of scales on upper part of opercle.

- *a*. No scales behind or below eye (*Güntheria*).
  - a'. A large dark blotch on upper part of caudal peduncle. . . . 2. *H. trimaculatus* p. 184.
  - b'. No dark blotch on caudal peduncle, often a zic-zac band along sides . . . . 3. *H. scapularis* p. 186.
- *b*. Scales behind or below eye.
  - a'. A large black ocellus on posterior part of spinous dorsal 4. *H. notophthalmus* p. 188.
  - b'. No ocellus on dorsal. A creamy white patch below and on anterior part of dorsal, followed by a black patch. . . 5. *H. centiquadrus* p. 189.

B. Head scaleless, with exception of the occiput.

- A′. Dorsal and anal with a low scaly sheath, consisting of a few rows of small scales. Head pointed. Mouth horizontal, slightly below level of lower border of eye. Dorsal spines feeble. Canines moderate (*Platyglossus*).
  - *a*. Caudal dark with light edges or light with a dark band.
    - a'. Caudal dark with narrow vertical bars or rows of spots and with a light border, which is broadest at the angles. No dark ocelli on dorsal or at base of caudal.
      - a^2. Head more pointed, its height 1.4 in its length. Bands on dorsal and anal oblique. No dark spot at base of pectoral 6. *H. leucurus* p. 192.
      - b^2. Head less pointed, its height 1.2 in its length. Bands on dorsal and anal horizontal. A dark spot at base of pectoral 7. *H. kallochroma* p. 193.
      - c^2. Head pointed, its height 1.5 in its length. Bands on dorsal and anal horizontal. No dark spot at base of pectoral 8. *H. richmondi* p. 195.
    - b^1. Caudal light, posteriorly with about four crescentic vertical bars, diffuse in their median part. No dark

ocelli on dorsal or at base of caudal. Dorsal and anal with longitudinal bars. 9. *H. melanurus* p. 195.

c^1. Caudal light with a broad vertical dark median or subterminal band.

a^2. Dark band on caudal sprinkled with small light ocelli. Dorsal and anal dark with similar light ocelli. Basal half of pectoral deep violet 10. *H. marginatus* p. 197.

b^2. Dorsal light, with a dark ocellus between first and second spines and between first to fifth rays . . . . . 11. *H. notopsis* p. 199.

b. Caudal light, without broad dark bands, sometimes with rows of spots or light ocelli.

a^1. No dark ocellus or spot between anterior dorsal rays. Back dark, with narrow light vertical bars. Dorsal with a row of light, dark edged ocelli. Caudal with a subterminal dark line and transverse rows of dark rings . . . . 12. *H. vroliki* p. 201.

b^1. Dorsal with a dark spot or ocellus between anterior rays.

a^2. A dark, white edged ocellus superiorly on caudal peduncle, at base of caudal . . . . . 13. *H. hoeveni* p. 202.

b^2. No dark ocellus or spot at base of caudal 11. *H notopsis juv.* p. 199.

B'. Dorsal and anal without scaly sheath. Head less pointed. Mouth generally much below level of lower border of eye (*Halichoeres* s. str.).

a. Anterior dorsal spines longer than posterior ones. First and second spines divergent.

a^1. Caudal with a dark spot at base. A dark ocellus between first and third dorsal spines. Body uniform . . . . 14. *H. solorensis* p. 204.

- b^1. No spot at base of caudal. No dark ocellus between first to third dorsal spines, but present between more posterior ones.
  - a^2. Body with two very distinct longitudinal bands on back and upper part of sides. . 15. *H. bicolor* p. 205.
  - b^2. Body with more or less developed dark blotches on the sides. Longitudinal bands, if present, only on anterior part of body.
    - a^3. Caudal brownish, spotted with paler and with the edges of the fin above and below broadly whitish . . . . 16. *H. nigrescens* p. 207.
    - b^3. Caudal light yellowish, with a black terminal transverse band, which may be developed on the median part of the fin only, or even totally wanting . . 17. *H. papilionaceus* p. 209.

b. Anterior dorsal spines shorter than posterior ones, the fin gradually increasing in height posteriorly.

- a^1. A black spot, blotch or dark ocellus between anterior dorsal spines.
  - a^2. A dark blotch or ocellus on soft dorsal.
    - a^3. A dark spot at base of caudal.
      - a^4. Two longitudinal bands on sides. Black blotches between 1st—4th dorsal rays at end of dorsal . . . . 18. *H. xanti* p. 210.
      - b^4. Sides with transverse bands or blotches, which have a more or

less reticulated appearance.

a^5. D. IX. 12 (13). No dark streak at base of pectoral . . 19. *H. leparensis* p. 211.

b^5. D. IX. 11 (12). Generally a dark streak at base of pectoral . . . 20. *H. binotopsis* p. 213.

b^3. No dark spot at base of caudal. Four canines in upper jaw, the outer ones curved backwards

a^4. Dorsal with vertical or oblique bars.

a^5. Anal with black spots. 21. *H. miniatus* p. 214.

b^5. Anal without black spots. 22. *H. margaritaceus* p. 216.

b^4. Dorsal posteriorly with white ocelli. Anal with white ocelli at base and a white longitudinal median band. . . 23. *H. nebulosus* p. 218.

b^2. No dark blotch or dark ocellus on soft dorsal.

a^3. A dark spot at base of caudal. Body with longitudinal bands . . . . . . 24. *H. hyrtli* p. 220.

b^3. No dark spot at base of caudal.

a^4. Sides of head without bands. Spot between 2nd and 3rd dorsal spines. 25. *H. prosopeion* p. 222.

b^4. Sides of head with longitudinal bands or rows of spots.

a^5. Dark spot between 1st—4th dorsal spines. No bands on body . . . . 26. *H. amboinensis* p. 223.

b^5. Dark spot between 1st and 2nd dorsal spines. Body with narrow longitudinal bands or reticulations . 27. *H. pardaleocephalus* p. 223.

b^1. No black blotch or dark ocellus between anterior dorsal spines[1]:

a^2. A dark blotch or dark ocellus on soft dorsal.

a^3. A dark spot at base of caudal.

a^4. Body with dark longitudinal bands . . . . 28. *H. kneri* p. 224.

b^4. Body without bands or with a silvery one. . 29. *H. timorensis* p. 225.

b^3. No dark spot at base of caudal. Body with more or less developed dark blotches on sides.

a^4. Black blotch on 1st to 4th dorsal rays . . . . 30. *H. kawarin* p. 227.

b^4. Black blotch on 3rd to 5th dorsal rays . . . . 31. *H. dayi* p. 228.

b^2. No black blotch or dark ocellus on soft dorsal.

a^3. Profile of head somewhat convex before eyes. A broad light yellowish band from operculum to median caudal rays, bordered above and below by a narrow grey wavy line . . 32. *H. hartzfeldi* p. 228.

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[1] In some individuals, belonging to species of the foregoing group, this blotch is wanting. It is therefore advisable to consult the group under a¹ in case of doubt.

b^3. Profile of head straight. No broad light band on body.

a^4. Body dark, each scale with a light centre, forming longitudinal rows of light round spots. Dorsal and anal with light, dark edged ocelli . . . . 33. *H. argus* p. 230.

b^4. Body without rows of light spots. Often a large dark blotch on sides.

a^5. A vertical black bar behind eye.

a^6. Height 2.9—3.1. P. 2.12. Head with broad dark bands, as broad as interspaces. Dorsal yellowish, with a median longitudinal violet band, with branches downwards to the bases of the rays and posterior spines 34. *H. chloropterus* p. 233.

b^6. Height 3.4—3.6. P. 2.12. Many scales of sides with a small dark spot 35. *H. gymnocephalus* p. 234.

c^6. Height

3—3.5. P. 2.13. Scales of sides with dark markings, forming reticulated figures. Dorsal with light spots. 36. *H. javanicus* p. 236.

b^5. No vertical black bar behind eye. Head and thorax light, rest of body dark, each scale with still darker basal blotch. Ventrals generally with a dark spot in the middle of the fin. . .37. *H. podostigma* p. 237.

1. **Halichoeres cyanopleura** (Blkr.)

Julis (*Halichoeres*) *cyanopleura* Bleeker, Nat. Tijdschr. Ned. Indië IV, 1853, p. 489.
Julis (*Halichoeres*) *pyrrhogrammatoïdes* Bleeker, ibid. p. 490.
Leptojulis cyanopleura Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 289. — Atl. Ichth. I, 1862, p. 128.
Leptojulis pyrrhogrammatoides Bleeker, l.c. — ibid. p. 129.
Leptojulis cyanopleura Günther, Cat Brit. Mus. IV, 1862, p. 167.
Leptojulis pyrrhogrammatoides Günther, l. c.

D. IX. 11. A. III. 11. P. 2. 11. V. I. 5. Ll. 29. Ltr. $\frac{1-1\frac{1}{2}}{\frac{1}{9}}$.

Height 3.9—4.1, 4.4—4.6 in length with caudal. Head 3.5—3.6, 4—4.1 in length with caudal. Height of head 1.5 in its length. Eye 6.6—6.7, twice in snout and 1.5 in rather convex interorbital space. Mouth slightly oblique, corner of mouth below anterior nostril. Four very long and very slender, somewhat distant canines anteriorly in both jaws; the median pair in the upper jaw curved, somewhat longer than the outer pair, which is more curved and which has the tip bent backwards. The median pair in the lower jaw is shorter than the outer pair, which are bent outwards. Head naked.

Four rows of small imbricate scales before dorsal. Dorsal spines slender, the first equal to snout, the last half diameter of eye longer. Soft dorsal slightly higher than spinous part. Third anal spine longest, equal to snout. Soft anal similar to soft dorsal. Pectorals as long as head without snout, ventrals half diameter of eye shorter. Caudal truncate or slightly rounded. Colour of preserved specimens: Males (*cyanopleura*) reddish brown, lighter below, scales of sides with a more or less distinct pearly white spot. A black patch, about 2 scales high and 2 scales deep, situated one scale below 5th—6th scales of lateral line. A broad pearly light blue band from snout through eye, over opercle and more or less distinctly continued as a longitudinal band on body, crossing the black patch just mentioned. A similar band from corner of mouth below eye to hindmargin of operculum, where it is bent upwards, following the opercular hindborder. Fins hyaline. Females (*pyrrhogrammatoides*): Uniform light brown, fins yellowish. When fresh a dark band from snout through eye to middle of base of caudal, now lost in the typical specimens of Bleeker's collection in the Leiden Museum. Length 127 mm.

Habitat: Java (Batavia!). — Philippines. In sea.

Note. Elsewhere (Bijdr. Dierk. Afl. 27, 1939, p. 14) I have explained, why I don't accept the genus *Leptojulis* and also why I think it almost certain, that *cyanopleura* and *pyrrhogrammatoides* are male and female of one and the same species.

2. **Halichoeres trimaculatus** (Q. G.)

Julis trimaculata Quoy & Gaimard, Voyage Astrolabe, Zool. III, 1834, p. 705.
Julis (*Halichoeres*) *spilurus* Bleeker, Nat. Tijdschr. Ned. Indië II, 1851, p. 252.
Güntheria trimaculata Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 291. — Atl. Ichth. I, 1862, p. 138.
Platyglossus trimaculatus Günther, Cat. Brit. Mus. IV, 1862, p. 153.
Platyglossus trimaculatus Kner, Novara Exp. Fische I, 1865, p. 255.
Choerojulis trimaculata von Martens, Preuss. Exp. Ost Asien I, 1876, p. 397.
Platyglossus (*Güntheria*) *trimaculatus* Bleeker, Arch. Neerl. Sc. Nat. XIII, 1878, p. 41.
Güntheria trimaculata Jordan & Snyder, Proc. U. S. Nat. Mus. XXIV, (1901) 1902, p. 635.
Halichoeres trimaculatus Jordan & Seale, Bull. Bur. Fish. XXV, (1905) 1906, p. 301.
Halichaeres trimaculatus Steindachner, Sitzber. Akad. Wien CXV, 1906, p. 1399.
Halichoeres trimaculatus Jordan & Richardson, Bull. Bur. Fish. XXVII, (1907), 1908, p. 266.
Platyglossus trimaculatus Günther, Fische der Südsee III, 1909, p. 266.
Halichoeres trimaculatus Snyder, Proc. U. S. Nat. Mus. XLII, 1912, p. 421.

Halichoeres trimaculatus McCulloch, Rec. Austr. Mus. IX. No 3, 1913, p. 385. — Austr. Zool. II, Prt. III, 1922, p. 98.

Halichores trimaculatus Whitley, Rec. Austr. Mus. XVI, No. 1, 1927, p. 25.

Halichoeres trimaculatus Fowler & Bean, Bull. U. S. Nat Mus. 100. Vol. VII, 1928, p. 258.

Halichoeres trimaculatus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 338. ibid. XI, 1931, p. 354.

Halichoeres trimaculatus P. J. Schmidt, Trans. Pac. Comm. Acad. Sc. USSR. I, 1930, p. 83.

Güntheria trimaculata Whitley, Brit. Mus. Gr. Barrier Reef Exp. Rep. Vol. IV, No. 9, 1932, p. 294.

Halichoeres trimaculatus Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 317.

Halichoeres trimaculatus Fowler, Acad. Nat. Sc. Philadelphia, Monogr. 2, 1938, p. 176.

D. IX. 11. A. III. 11. P. 2. 12. V. I. 5. Ll. 28. Ltr. $\begin{array}{c}2\frac{1}{2}\\ \hline 1\\ \hline 9\end{array}$.

Height 3.3—3.4, 3.9—4.1 in length with caudal. Head 3.1—3.2, 3.6—3.9 in length with caudal. Height of head 1.2—1.3 in its length. Mouth horizontal. Maxillary not reaching quite to below anterior nostril. Eye 5—7, 1.7—2.8 in snout (according to age) and 1—1.4 in rather convex interorbital space. Lips rather thick, plated, the inner plate crenulated. A single row of pointed teeth in the jaws. Four canines anteriorly in the upper jaw, the middle pair longest and directed forwards, the outer pair curved outwards and backwards. A canine at corner of mouth. Two canines in the lower jaw, directed forwards. A group of about 10—11 scales, in 3 longitudinal rows, on upper part of opercle. About 10 rows of elongate scales before dorsal, smaller than those of the body, at least those on the median line of the nape. Scales of the thorax also somewhat smaller than those of the sides. Dorsal spines stiff and pungent. First spine about as long as eye, the last about twice eye. Soft dorsal not much higher than spinous part, pointed behind. First anal spine minute, third longest, somewhat longer than eye. Soft anal somewhat less deep than dorsal, pointed behind. Pectorals about as long as head without snout. Ventrals with the first ray greatly produced, half length of snout shorter than eye. Caudal slightly rounded. Colour of preserved specimens pinkish above, lighter below, head bluish above. A chalky light blue band from snout to below eye, two others on operculum and suboperculum, often fused with each other and with the first band, which in that case is bent downwards. A crescentic spot of the same colour on interoperculum. Some spots of similar colour behind eye. A stripe of same colour along base of pectorals and a band from behind axil, obliquely directed downwards to belly. Posterior edge of scales of sides with a light bluish vertical streak, sometimes preceded by a dark brown stripe. In young specimens these dark stripes are specially developed on scales of sides below lateral line and immediately behind end of pectoral, forming here a more or less distinct dark blotch. A dark spot, larger than eye, on upper part of caudal peduncle, immediately behind dorsal. Spinous dorsal yellowish hyaline, with a basal and a median narrow longitudinal white band, continued on soft dorsal, which has a broader light terminal longitudinal band; the two lower bands anastomose here and form a series of rings, forming a chain. Anal yellowish hyaline, with a white basal and a median light blue longitudinal band. Caudal, pectorals and ventrals light yellowish. A small black triangular spot superiorly at base of pectoral. Length 154 mm.

Habitat: Lombok!; Saleyer!; Tukang Besi Islands!; Celebes (Makassar, Menado, Bara Reef in Gulf of Boni); Sangi Islands; Talaut Islands; Flores!; Rotti!; Timor!; Buru; Ambon; Ceram; Haruko; Banda; Goram; Letti; New Guinea (Manokwari, Hood Bay). — Cocos Keeling Islands, Philippines, China, Riu Kiu Islands, Japan, Pelew Islands, Queensland, New South Wales?, Solomon Islands, New Hebrides, Lord Howe Island, Rotuma, Fiji, Samoa, Tubuai, Society Islands, Paumotu Islands. In sea, on coral reefs.

3. **Halichoeres scapularis** (Benn.)

Julis scapularis Bennett, Proc. Comm. Zool. Soc. London I, 1831, p. 167.
Halichoeres coeruleovittatus Rüppell, Neue Wirbelth. Fische 1835, p. 14.
Julis (Halichoeres) elegans Bleeker, Nat. Tijdschr. Ned. Indië III, 1852, p. 289.
Julis (Halichoeres) phaiotaenia Bleeker, ibid. XIII, 1855, p. 322.
Güntheria coeruleovittata Bleeker, Proc. Zool. Soc. London 1861, p. 413. — Versl. Akad. Amsterdam XIII, 1862, p. 291. — Atl. Ichth. I, 1862, p. 137.
Platyglossus scapularis Günther, Cat. Brit. Mus. IV, 1862, p. 146. — Fishes of Zanzibar 1866, p. 94.
Güntheria scapularis Bleeker, Versl. Akad. Amsterdam (2) II, (1867) 1868, p. 286.
Platyglossus scapularis Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 545.
Choerojulis scapularis von Martens, Preuss. Exp. Ost-Asien, Bd. I, 1876, p. 397.
Platyglossus scapularis Day, Fishes of India, Prt. 3, 1877, p. 400.
Platyglossus (Güntheria) scapularis Bleeker, Arch. Neerl. Sc. Nat. XIII, 1878, p. 41.
Halichoeres cymatogrammus Jordan & Seale, Proc. U. S. Nat. Mus. XXVIII, 1905, p. 786.

Halichoeres scapularis Evermann & Seale, Bull. Bur. Fish. XXVI (1906), 1907, p. 94.
Halichoeres scapularis Seale, Occas. Papers B. P. Bishop Mus. IV, 1906, p. 56.
Halichoeres scapularis Jordan & Seale, Bull. Bur. Fish. XXVI, (1906) 1907, p. 29.
Platyglossus scapularis Günther, Fische der Südsee III, 1909, p. 263.
Platyglossus scapularis M. Weber, Siboga Exp. Fische 1913, p. 372.
Platyglossus scapularis Barnard, Ann. S. Afric. Mus. XXI, 1925—1927, p. 752.
Halichoeres scapularis Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 255.
Halichoeres scapularis Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 338.
Halichoeres scapularis Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 309.

D. IX. 11. A. III. 11. P. 2. 12. V. I. 5. Ll. 28—29. Ltr. $\begin{array}{c}2-3\\\hline 1\\\hline 8-9\end{array}$.

Height 3.1—3.5, 3.6—4 in length with caudal. Head 3.1—3.3, 3.6—3.8 in length with caudal. Height of head 1.1—1.3 in its length. Profile of head variable, almost straight or gently curved from tip of snout to above eyes. Mouth horizontal, maxillary nearly reaching to below anterior nostril. Lips rather thick, plated, the inner plate crenulated. A single series of pointed teeth in the jaws. Four canines anteriorly in upper jaw, the middle pair longer and directed forwards, the outer pair curved outwards and backwards. A canine at corner of mouth. Two canines anteriorly in the lower jaw, directed forwards. A group of about 9 small scales, in 3 longitudinal rows, on upper part of opercle. About 10 rows of elongate scales before dorsal, smaller than those of the rest of the body, excepting those of the thorax, which are also smaller. Scales beginning on head above hindborder of eye. Dorsal spines stiff and pungent, the first scarcely longer than eye, the last nearly twice eye. Soft dorsal pointed, somewhat higher than spinous part, the longest ray more than twice eye. First anal spine very small, third longest, not quite one eye diameter and a half. Soft anal somewhat less deep than soft dorsal, pointed behind. Pectorals as long as head without snout or somewhat shorter. Ventrals with the first ray much produced, about half diameter of eye longer than pectorals. Caudal slightly rounded. Least height of caudal peduncle somewhat more than postorbital part of head or equal to head without snout. Colour of preserved specimens yellowish. Head darker above. A more or less cuneate light blue patch between eye and upper lip. A patch of the same colour below eye, continued round lower margin of eye backwards and upwards on scaly part of opercle. One or two elongate spots of same colour on opercle, sometimes united with the former one. A blue stripe above eye, forming an eye brow, followed by one or two other stripes or spots. Similar spots on interorbital space and on upper part of snout. A light blue band from opercular flap, obliquely downwards, to pectoral axil, and continued on belly. Scales of upper part of sides with light blue hindborders, the anterior scales of lateral line almost entirely blue. In young specimens these scales are darker, almost black, and the band on head through scaly patch of opercle is of the same colour, forming a dark band from eye to below origin of dorsal, and, as the margins of the scales of the lateral line and of the scales below it are often also black in stead of blue, the band is continued as a dark zic-zac to upper part of caudal peduncle or to base of caudal. Dorsal and anal with a white basal and a light blue subterminal longitudinal band. Caudal with 4—6 transverse bands in older specimens, sometimes anastomosing or broken into spots. Pectorals and ventrals yellowish hyaline. Length over 180 mm.

Habitat: Singapore; Sumatra (Padang, Priaman, Siboga); Nias; Batu Islands; Java (Batavia!, Prigi); Bawean; Celebes (Menado!, Tanawanko; Gulf of Boni); Gomomo Island; Saleyer!; Siau!; Sangi Islands; Sulu Islands!; Buru; Ceram; Ambon!; Goram; Banda!; Flores; Timor; Aru Islands; Misol; Waigeu!; New Guinea. — Coast of Zululand, Mozambique, Zanzibar, Red Sea, Mauritius, Coast of British India, Andamans, Philippines!, Queensland, Solomon Islands, New Britain, New Hebrides, Lord Howe Island. In sea.

4. **Halichoeres notophthalmus** (Blkr.)

Tautoga notophthalmus Bleeker, Acta Soc. Sc. Indo-Neerl. I Beschr. vischs. Manado, 1856, p. 53.

Hemitautoga notophthalmus Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 292. — Atl. Ichth. I, 1862, p. 140.

Platyglossus notophthalmus Günther, Cat. Brit. Mus. IV, 1862, p. 160.

Platyglossus (Hemitautoga) notophthalmus Bleeker, Arch. Neerl. Sc. Nat. XIII, 1878, p. 41.

Halichoeres notophthalmus Jordan & Seale, Bull. Bur. Fish. XXV, (1905) 1906, p. 301.

Platyglossus notophthalmus Günther, Fische der Südsee III, 1909, p. 272.

Halichoeres notophthalmus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 338.

D. IX. 11 (12). A. III. 11 (12). P. 2. 11. V. I. 5. Ll. 27—28.

Height 3.6, 4.2 in length with caudal. Head 3.4, 3.9 in length with caudal. Height of head 1.4 in its length. Eye 3.5, 1.3 in snout. A small patch of scales on superior part of opercle and behind eye.

Four canines anteriorly in each jaw. Dorsal spines moderate, the last spine longest. Soft dorsal slightly higher than spinous part. Caudal rounded. Colour of type brownish, body with irregular darker transverse blotches. A dark spot at base of pectoral. A black ocellus between 5th—7th dorsal spines. Superior part of soft dorsal and posterior part of spinous dorsal darkish. Caudal white, but a large triangle, the base of which is formed by the base of the fin and the top situated at the extremity of the median rays, greyish. A specimen of 52 mm long is creamy white. A broad brown transverse band extending from third dorsal spine to fourth dorsal ray downwards to before anus and to anterior anal rays, much darker superiorly. Inferiorly the scales have a light centre, giving to the band a reticulated appearance. A similar but much narrower band on caudal peduncle, the scales dark with a light centre. An irregular longitudinal band connects the two transverse bands, formed by dark scales with a light centre. A black patch on occiput, and two small black spots on anterior part of interorbital space. A brown band from snout through eye to temporal region, widening here. A similar band from below lower lip, below eye to subopercle and continued downwards on thorax as a broad band to base of ventrals, where it meets that of the other side. A small black spot between first and second dorsal spines. A black ocellus in the dark part of the dorsal between the fifth to seventh dorsal spines and a much larger and more distinct one between the last spine and the fourth dorsal ray. Anal white with a black basal blotch anteriorly, connected with the transverse band of the body and another blotch at the end of the fin, spreading on tail and connected with the longitudinal band on the sides of the tail. Pectorals white with a small triangular spot superiorly at its base. Ventrals white, excepting their base, which is dark, the colour fusing with that of the band on thorax. Caudal white, without markings. Length 72 mm. (Type in the British Museum examined).

Habitat: Java (Karangbollong, Palabuhan Ratu); Celebes (Menado); Flores!; Goram; Timor; New Guinea. — Rarotonga, Samoa. In sea.

5. **Halichoeres centiquadrus** (Lac.)

Labrus centiquadrus Lacepède, Hist. Nat. Poissons III, 1802, p. 437, p. 493.
Labrus hortulanus Lacepède, ibid. p. 449, p. 518.
Sparus decussatus Bennett, Fishes of Ceylon, 1834, p. 14.
Halichoeres eximius Rüppell, Neue Wirbelth. Fische 1835, p. 16.
Julis hortulanus Cuvier & Valenciennes, Hist. Nat. Poissons XIII, 1839, p. 430.

Julis hortulanus Rüppell, Samml. Senckenberg. Museum 1852, p. 20.
Julis (Halichoeres) hortulanus Bleeker, Nat. Tijdschr. Ned. Indië IV, 1852, p. 486.
Hemitautoga centiquadra Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 292. — Atl. Ichth. I, 1862, p. 139.
Platyglossus hortulanus Günther, Cat. Brit. Mus. IV, 1862, p. 147. — Fishes of Zanzibar 1866, p. 94.
Platyglossus hortulanus Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 546.
Platyglossus hortulanus Day, Fishes of India, Prt. 3, 1877, p. 399.
Platyglossus (Hemitautoga) centiquadra Bleeker, Verh. Akad. Amsterdam XVIII (1877), 1879, Contrib. fauna Maurice, p. 10.
Platyglossus hortulanus Steindachner, Abh. Senckenberg. Naturf. Ges. XXV, 1901, p. 442.
Halichoeres hortulanus Seale, Occas. Papers B. P. Bishop Mus. I, 1901, p. 88.
Hemitautoga centiquadra Waite, Rec. Austr. Mus. IV, 1901, p. 54.
Guntheria centiquadra Jordan & Evermann, Proc. U. S. Nat. Mus. XXV, 1902, p. 355.
Halichoeres centiquadrus Jordan & Seale, Bull. Bur. Fish. XXV (1905), 1906, p. 300.
Halichoeres centiquadrus Jordan & Richardson, Bull. Bur. Fish. XXVII (1907), 1908, p. 266.
Platyglossus hortulanus Günther, Fische der Südsee III, 1909, p. 263.
Platyglossus centriquadrus M. Weber, Siboga Exp. Fische 1913, p. 375.
Halichoeres centiquadrus McCulloch, Austr. Zool. II, Prt. III, 1922, p. 98.
Halichoeres centriquadrus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 337. — ibid. XI, 1931, p. 354.
Halichoeres centriquadrus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 253.
Halichoeres centriquadrus Fowler, Occas. Papers B. P. Bishop Mus. IX, 1932, p. 13.
Halichoeres centiquadrus Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 311.
Halichoeres centriquadrus Fowler, Acad. Nat. Sc. Philadelphia, Monogr. 2, 1938, p. 109.

D. IX. 11. A. III. 11. P. 2. 12. V. I. 5. Ll. 26. Ltr. $\begin{array}{c}2\frac{1}{2}-3\\ \hline 1\\ \hline 9\end{array}$.

Height 2.7—3.1, 3.2—3.7 in length with caudal. Head 3.1—3.2, 3.7—3.8 in length with caudal. Height of head 1.1—1.3 in its length. Eye 5—7, 1.8—2.7 in snout and 1.6—1.8 in interorbital space, which is much convex in adults, less so in young. Mouth horizontal. Maxillary reaching almost to below anterior nostril. Lips rather thick, plated, the inner plate crenulated. Pointed teeth in a single row in both jaws. Four canines in front of upper jaw, the middle pair longer, slightly curved and directed forwards, the outer pair curved outwards and backwards. Four canines anteriorly in the lower jaw, the median pair almost straight and directed forwards, the outer pair much shorter, but distinctly longer than the following teeth. A patch of teeth on upper part of opercle, another on temporal region and two transverse rows behind and partly below eye. About 12 rows of scales before dorsal, the anterior ones, above hindborder of eye, much smaller than the rest, pointed and partly imbedded in the skin. Similar small pointed scales on thorax, immediately behind isthmus. Gillmembranes united, free from isthmus. Dorsal spines slender, but stiff and pungent. First spine equal to eye, last twice diameter of eye. Soft dorsal somewhat higher, the longest ray about as long as snout. Fins moderately pointed behind. First anal spine about equal to eye, third spine longest, not quite one eye diameter and a half. Spines stiff and pungent, slender. Soft anal similar to soft dorsal. Pectorals long, half length of snout shorter than head. Ventrals, with the first ray produced, as long as head without snout. Caudal somewhat rounded. Colour of preserved specimens reddish brown above, light yellowish below; head above darker, more violet. The following pinkish chalky bands on the head: One from snout to frontborder of eye; a second above it, running above eye to nape and here connected with that of the other side, or the bands of both sides are totally fused into a large elongate interorbital patch. Two bands from upper and hindborder of eye, continued as rows of spots to below dorsal. A band from chin, where it meets that of the other side, crossing preopercle below eye, bent downwards at hindborder of preopercle and with a branch on operculum, which may be united or not with another band, higher up on operculum. A creamy white patch below 4th and 5th dorsal spines, spreading also on fin. Behind it a black blotch, to below 8th spine and also extending on fin. Scales of body, excepting those before the creamy patch, and which have chalky pinkish spots as said before, with a dark brown vertical stripe, broader on back, narrower on sides and reduced to round spots on lower rows. Scales of belly with light spots as also those of thorax, where the spots may fuse into short bands. A second, much smaller creamy blotch may be present below 5th—6th dorsal spines and still another below end of dorsal. Anterior part of spinous part of dorsal as described creamy and dark brown. A light longitudinal band from 1st to 3rd spines. Rest of spinous dorsal and soft dorsal creamy, with vertical or oblique light bluish bands, with narrow dark margins. In younger specimens these bands anastomose and form rows of rings or ocelli. Anal with traces of longitudinal bands. Caudal with faint traces of vertical bands. Pectorals yellowish hyaline, with some chalky markings at base and a black axil. Ventral yellowish. Length 255 mm.

Nomen indig. Chaul-chaul taréh vabah (Simalur, Tapah).

Habitat: Sumatra (Padang, Ulakan, Priaman); Simalur!; Batu Islands; Nias!; Java (Batavia, Prigi, Anjer); Borneo; Celebes (Menado, Tombariri); Karkaralong!; Talaut Islands!; Sangi Islands; Sulu Islands!; Halmahera; Ternate; Tidore; Ceram; Ambon; Letti; Goram; Banda!; Flores; Timor; Misol; New Guinea (Manokwari, Papua). — Madagascar, Zanzibar, Red Sea, Mauritius, Ceylon, Coasts of British India, Andamans, Formosa, China, Philippines, Solomon Islands, New Hebrides, New South Wales?, Sandwich Islands, Rotuma, Fiji, Society Islands, Christmas Island. In sea, near reefs.

6. **Halichoeres leucurus** (Walb.). (Fig. 33. p. 176)

Labrus leucurus Walbaum, Artedi Pisc. III, 1792, p. 249.
Labrus leucurus Bloch Schneider, Syst. Ichth. 1801, p. 259.
Labrus purpurescens Bloch Schneider, ibid. p. 262.
Julis (*Halichoeres*) *Temmincki* Bleeker, Nat. Tijdschr. Ned. Indië IV, 1853, p. 491.
Julis (*Halichoeres*) *kallopisos* Bleeker, ibid. V, 1853, p. 348.
Platyglossus purpurescens Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 284. — Atl. Ichth. I, 1862, p. 108.
Platyglossus marginatus Day, Fishes of India, Prt. 3, 1877, p. 398 (partim).
Halichoeres leucurus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 260.
Halichoeres leucurus Fowler, Mem. B. P. Bishop Mus. XI, 1934, p. 437.
Halichoeres purpurascens Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 316.

D. IX. 13 (14). A. III. 13 (14). P. 2. 12. V. I. 5. Ll. 28. Ltr. $\begin{array}{c} 2+2^{1)} \\ \hline 1 \\ \hline 10 \end{array}$.

Height 3.3, 4 in length with caudal. Head pointed, 3.2, 3.9 in length with caudal. Height of head 1.4 in its length. Eye 4, 2.2 in snout and 1.3 in convex interorbital space. Mouth small, horizontal, slightly below level of lower border of eye. Maxillary by far not reaching to below anterior nostril. A single row of pointed, somewhat curved teeth in the jaws (besides some very small granular teeth on the innerside of the jaws), increasing in size anteriorly, the 6 front ones in the upper and the 4 front ones in the lower jaw moderate canines or caninoids. A posterior canine at corner of mouth. Head naked, excepting above, where the scales begin above

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1) There are two rows of normal scales and two rows of small scales, forming the sheath at base of dorsal.

hinderpart of eye. About 15 rows of scales before dorsal, the anterior ones much smaller than those of the body. Similar small scales on thorax, immediately behind isthmus. Dorsal spines feeble, but stiff and pungent. First spine equal to eye, last spine not quite twice eye. Soft dorsal higher than spinous part, longest ray equal to snout. Dorsal pointed behind. First anal spine very small, third longest, somewhat longer than eye. Anal spines stiff and pungent. Soft anal similar to soft dorsal. Pectorals and ventrals, which have the first ray somewhat produced, subequal, as long as head without snout. Caudal rounded. Least height of caudal peduncle equal to postorbital part of head. Colour of preserved specimen reddish brown, cheeks and preorbitals violet, lower lip yellow. A chalky pinkish band from tip of snout to upper margin of eye. A second band from corner of mouth, touching lower border of eye, widened on operculum. Two similar bands below it, parallel with each other and with the upper one, running from chin, the first to base of pectorals, the lower one to above base of ventrals. Body with indications of darker lines along the longitudinal rows of scales. Dorsal and anal greyish, with a white edge and brownish oblique bars. Caudal brownish, with vertical bars, the distal part white in this way, that the outer rays are white for their distal half, the following rays gradually with less white, so that the innermost rays have only a white tip. Pectorals and ventrals hyaline. Length 133 mm.

Habitat: Banka; Java (Batavia, Japara); Bawean; Celebes (Makassar); Ambon!; Timor; Schouten Islands.—Andamans, Indochina, Philippines, Solomon Islands.

Note. The specimen described and figured by Day l.c. as a variety of *marginatus,* belongs to *leucurus.*

7. **Halichoeres kallochroma** (Blkr.).

Julis (Halichoeres) kallochroma Bleeker, Nat Tijdschr. Ned. Indië IV, 1853, p. 289.
Platyglossus kallochroma Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 284. — Atl. Ichth. I, 1862, p. 109.
Platyglossus kallochroma Günther, Cat. Brit. Mus. IV, 1862, p. 159.
Platyglossus flos-corallis Jordan & Seale, Bull. Bur. Fish. XXV (1905), 1906, p. 299.
Platyglossus flos-corallis Günther, Fische der Südsee III, 1909, p. 269.
Halichoeres kallochroma Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 261.
Halichoeres kallochroma Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 339.
Halichoeres kallochroma Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 308.

D. IX. 12. A. III. 12. P. 2. 12. V. I. 5. Ll. 28. Ltr. $\begin{array}{c}2+2\\ \hline 1\\ \hline 9\end{array}$ 1)).

Height 3.3—3.4, 3.9—4.1 in length with caudal. Head pointed, 3.4—3.5, 4.1—4.2 in length with caudal. Height of head 1.2 in its length. Eye 5.2—5.4, 1.8 in snout and 1.2—1.3 in somewhat convex interorbital space. Mouth small, horizontal, slightly below level of lower border of eye. Maxillary by far not reaching to below anterior nostril. A single row of pointed, somewhat curved teeth in the jaws increasing in length anteriorly, the anterior ones moderate canines. A posterior canine at corner of mouth. Head naked, excepting above, where the scales begin above hindmargin of eye. About 13—14 rows of scales before dorsal, the anterior ones much smaller, as also those on thorax immediately behind isthmus. Dorsal spines feeble but stiff and pungent, first scarcely as long as eye, last not quite twice diameter of eye. Soft dorsal higher than spinous part, pointed behind, the longest ray equal to snout. Anal spines stiff and pungent, first less than eye, third longest, one eye diameter and a half. Soft anal similar to soft dorsal. Colour of preserved specimens brownish above, light below. Body with longitudinal light brownish bands, corresponding to rows of scales, as broad as interspaces. Two faint bands, bordered with white, on each side from snout to eye, anastomosing in the middle of their course and just before eyes. Faint traces of a band on chin, and of bands below eye. Dorsal greyish, with a white outer margin, followed proximally by a narrow dark sepia line and with irregular longitudinal more or less wavy bands, narrowly bordered with sepia and often broken into smaller bits or round patches, specially posteriorly. Anal similar or with only two longitudinal bands, the lower one broken into spots posteriorly, the upper one broadening posteriorly and forming a broad white subbasal band on soft part of fin. Caudal with similar bands as dorsal, but placed vertically, and often broken into short bits or spots. Outer margin of caudal white, followed by a narrow sepia stripe, the outer rays white for their distal half, the following rays gradually with less white, the median rays only white at tip. Pectorals and ventrals white. A brown diffuse blotch on upper part of base of pectorals. Length 123 mm.

Habitat: Sumatra (Padang!, Priaman); Nias.—Philippines, Pelew Islands, Fiji, Samoa. In sea.

Note. This species is very close to *leucurus*. Bleeker gives as

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1) See footnote p. 192.

difference the number of dorsal and anal rays, the shape of the head, which is less pointed, and the different arrangements of the bands on the head and on dorsal and anal, the bands on these fins being longitudinal and not oblique.

8. **Halichoeres richmondi** Fowler & Bean

Halichoeres richmondi Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 263.

D. IX. 12. A. III. 12. P. 2. 12. V. I. 5. Ll. 28—29. Ltr. $\begin{array}{c} 4 \\ \hline 1 \\ \hline 9-10 \end{array}$.

Height 2.9—3.4. Head 3.2—3.4, its height about 1.5 in its length. Eye 6.2—6.4, 2.2—2.7 in snout and 1.5—1.6 in convex interorbital space. Mouth very small, corner of mouth far before anterior nostril. Teeth uniserial, rather slender. Two canines in front of each jaw. A posterior canine present. Dorsal spines increasing in height posteriorly, the first almost half length of snout, the ninth slightly less than snout, 3.6—3.8 in head. Soft dorsal somewhat higher than spinous part. First anal spine less than eye, third longest, somewhat longer than first dorsal spine, 5—5.5 in head. Pectorals rounded, equal to head without snout. Ventrals pointed, longer than pectorals. Caudal rounded. Body brown generally. Each row of scales on trunk with narrow deeper brown median line, including in its course blue basal spot to scale, but little wider than width of band; these bands all extend as more or less narrow bands on head longitudinally. On head and breast ground colour deep neutral slaty. Postocular pale brown band from hind eye back to suprascapula and cuneated brownish white blotch above pectoral axil. Dorsal and anal slaty, with narrow creamy margins; each fin with 3 or 4 longitudinal dusky lines, variously broken or as spots; margin broadly creamy. Paired fins creamy basally, terminally grayish and first branched ray grayish. Length 158 mm (After Fowler and Bean's description, not seen by me).

Habitat: Cape Kait, Libani Bay, Celebes.—Philippines.

Note. This species seems to be very close to *H. leucurus* and *H. kallochroma*.

9. **Halichoeres melanurus** (Blkr.).

Julis (*Halichoeres*) *melanurus* Bleeker, Nat. Tijdschr. Ned. Indië II, 1851, p. 251. — ibid. V, 1853, p. 87.

Platyglossus melanurus Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 284. — Atl. Ichth. I, 1862, p. 109.

Platyglossus melanurus Günther, Cat. Brit. Mus. IV, 1862, p. 148. — Fische der Südsee III, 1909, p. 265.
Halichoeres melanurus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 262.
Halichoeres melanurus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 340.

D. IX. 12 (13). A. III. 12. P. 2. 12. V. I. 5. Ll. 28—29. Ltr. $\begin{array}{c}2\frac{1}{2}\\\hline 1\\\hline 9\end{array}$.

Height 3.1—3.7, 4—4.5 in length with caudal. Head 3.2, 4—4.2 in length with caudal. Height of head 1.2 in its length. Eye 4.6—5.5, 1.5—1.8 in snout and 1.1—1.4 in somewhat convex interorbital space. Mouth small, slightly oblique. Tip of snout slightly below level of lower margin of eye. Maxillary almost reaching to below anterior nostril. A single row of pointed teeth in the jaws, increasing in length anteriorly, the anterior ones moderate canines. A strong canine at corner of mouth. Head naked, excepting above, where scales begin above hinder part of eye. About 11—12 rows of small scales before dorsal. Similar small scales on thorax between isthmus, base of pectorals and ventrals. Dorsal spines feeble but stiff and pungent, first equal to eye, second diverging from first, last spine equal to snout. Soft dorsal somewhat higher than spinous part, the longest ray half diameter of eye longer than longest spine. Dorsal pointed. First anal spine minute, third longest, somewhat longer than eye. Soft anal similar to soft dorsal. Pectorals about as long as head without snout. Ventrals with the first ray produced slightly shorter than head. Caudal rounded. Colour of preserved specimens brownish or salmon coloured. In life with five dark cross bands on the back, but not visible in my specimens. The following chalky bluish bands on head: One band from snout to eye. A narrower band from above eye to origin of dorsal. Two narrow bands from upper part of hindborder of eye, parallel to each other, running to below first dorsal spine, more or less broken into spots beyond head. A similar band below these on body. A broad band from chin, running upwards to below eye, then deflected to lower hindmargin of operculum, sharply bent upwards here and following border of opercle. This band is continued on body as a longitudinal one, running to base of pectoral. Below it two parallel bands, one beginning on preopercle, the lower one on interopercle, and continued almost to above anus. A dark vertical streak behind eye. Axil of pectoral superiorly black. Dorsal hyaline, with a brownish median band, bordered above and below by a white line, darker on membranes between anterior spines, faint on soft dorsal. Base of anal brown, separated by a narrow longitudinal dark line from a creamy broad longitudinal band, followed by a light violet longitudinal band, bordered above and below by a narrow dark line and with a narrow longitudinal light brown band between them, dividing the violet band in an upper and a lower one. Lower margin of anal white. Caudal yellowish, posteriorly with about four crescentic vertical brown bands, the proximal ones often deflected in their course and bent in the direction of the base of the fin, forming more or less distinct loops. In their median part these bands are more or less washed out, as if drawn on blotting paper, forming a large dark patch on posterior median part of caudal. Pectorals and ventrals light brown or white. Length 115 mm. (Specimens of Bleeker's collection in the Amsterdam Museum examined).

Habitat: Bawean; Celebes (Menado); Sangi Islands; Flores; Solor; Timor; Buru; Ceram; Ambon; Banda; Goram; Kei Islands!; New Guinea (Manokwari, South Cape). — Philippines, Pelew Islands, New Britain, Samoa. In sea.

10. **Halichoeres marginatus** (Rüpp.)

Halichoeres marginatus Rüppell, Neue Wirbelth. Fische 1835, p. 16.
Julis annularis Cuvier & Valenciennes, Hist. Nat. Poissons XIII, 1839, p. 482.
Julis marginatus Cuvier & Valenciennes, ibid. p. 490.
Julis annularis Bleeker, Verh. Bat. Gen. XXII (1847), 1849. Labroid diagn. p. 6.
Julis marginatus Rüppell, Samml. Senckenberg. Mus. 1852, p. 20.
Julis (Halichoeres) annularis Bleeker, Nat. Tijdschr. Ned. Indië V, 1853, p. 513.
Platyglossus marginatus Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 283. — Atl. Ichth. I, 1862, p. 109.
Platyglossus marginatus Günther, Cat. Brit. Mus. IV, 1862, p. 160.
Platyglossus marginatus Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 545.
Platyglossus marginatus Day, Fishes of India, Prt. 3, 1877, p. 398 (partim).
Platyglossus marginatus Günther, Fische der Südsee III, 1909, p. 271.
Platyglossus marginatus Jordan & Seale, Bull. Bur. Fish. XXV (1905), 1906, p. 299.
Halichoeres marginatus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 265.
Halichoeres marginatus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 340.

D. IX. 13 (14). A. III. 12. P. 2. 12. V. I. 5. Ll. 27—28.

Ltr. $\begin{array}{c}2\frac{1}{2}-3\frac{1}{2}\\ \hline 1\\ \hline 9-10\end{array}$.

Height 2.7—3.1, 3.3—3.7 in length with caudal. Head 3.4—3.5, 4.1—4.2 in length with caudal. Height of head 1—1.2 in its length.

Eye 4.8—6.4, 1.6—2.2 in snout and 1.2—1.6 in convex interorbital space. Mouth small, nearly horizontal, slightly below level of lower border of eye. Teeth in a single row, directed forwards, especially anteriorly, where the teeth are longer and moderate canines. One, or exceptionally two canines at corner of mouth. Head naked, excepting above, where the scales begin above hinder part of eye. About 15—17 rows of scales before dorsal, smaller than those of body, specially anteriorly. Similar small scales on thorax, immediately behind isthmus, both not extending as far as pectorals or ventrals, where the scales are much larger. Dorsal spines feeble, but stiff and pungent. First spine equal to or shorter than eye, parallel to the following. Last spine as long as snout or half diameter of eye longer. Soft dorsal higher than spinous part, the longest ray equal to snout and eye together. Dorsal pointed behind. First anal spine minute, third longest, as long as snout. Soft anal similar to soft dorsal. Pectorals half length of snout shorter than head. Ventrals, with the first ray produced, slightly shorter than pectorals. Caudal rounded. Colour of preserved specimens dark bluish brown, thorax and hinder part of operculum lighter. Branchiostegal membrane whitish. Each scale of body with a dark centre. Head above dark bluish grey. A dark band from snout to eye, another from corner of mouth to lower border of eye, a third from lower lip, below eye, continued on operculum. Two parallel bands from hindborder of eye to upper part of operculum. Dorsal and anal very dark violet, with a narrow white outer border and covered with light dark edged ocelli, smaller in the periphery, larger near base and here sometimes confluent into short bars, especially in the hinder part of the anal. On the spinous dorsal the ocelli also fuse into more or less distinct longitudinal bars. Caudal dusky white or creamy, with a broad transverse dark violet bar in the middle, bent forwards near the upper and lower rays. This bar is sprinkled with very small light ocelli and has a clear white narrow front and hind border. Basal half of pectorals deep violet, then white and hyaline near tip. Ventrals yellowish, spine and first ray dark violet. Length 160 mm. (A specimen of Bleeker's collection in the Amsterdam Museum examined).

Nomen indig. Chaul-chaul (Simalur).

Habitat: Sumatra (Padang, Trussan, Benkulen); Simalur!; Batu Islands; Nias!; Java (Karangbollong, Patjitan, Prigi); Ambon; Timor; Misol; Schouten Islands.—Mozambique, Red Sea, Mauritius, Ceylon, Coasts of British India, Philippines, Samoa, Society Islands. In sea.

11. **Halichoeres notopsis** (C.V.)

Julis notopsis Cuvier & Valenciennes, Hist. Nat. Poissons XIII, 1839, p. 485.
Julis notopsis Bleeker, Verh. Bat. Gen. XXII (1847), 1849. Labroid, diagn. p. 6.
Julis (*Halichoeres*) *notopsis* Bleeker, Nat. Tijdschr. Ned. Indië IV, 1853, p. 290.
Julis (*Halichoeres*) *phaiopus* Bleeker, ibid. p. 291.
Platyglossus notopsis Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 284. — Atl. Ichth. I, 1862, p. 111.
Platyglossus notopsis Günther, Cat. Brit. Mus. IV, 1862, p. 154. — Proc. Zool. Soc. London 1871, p. 667.
Platyglossus notopsis Day, Fishes of India, Prt. 3, 1877, p. 398.
Platyglossus notopsis Jordan & Seale, Bull. Bur. Fish. XXV (1905), 1906, p. 299.
Platyglossus notopsis Jordan & Richardson, ibid. XXVII (1907), 1908, p. 266.
Platyglossus notopsis Günther, Fische der Südsee III, 1909, p. 268.
Platyglossus notopsis Snyder, Proc. U. S. Nat. Mus. XLII, 1912, p. 507.
Halichoeres notopsis Jordan & Starks, Ann. Carnegie Mus. XI, N° 3—4, 1917, p. 457.
Halichoeres notopsis Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 267.
Halichoeres notopsis Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 340.
Halichoeres notopsis Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 308.

D. IX. 13. A. III. 12. P. 2. 12. V. I. 5. Ll. 28—29. Ltr. $\dfrac{2\frac{1}{2}-3\frac{1}{2}}{\dfrac{1}{9-10}}$.

Height 2.9, 3.5 in length with caudal. Head 3.2, 3.9 in length with caudal. Height of head 1.1—1.3 in its length. Eye 4—4.2, 1.3—1.5 in snout and equal to slightly convex interorbital space. Mouth small, horizontal, almost in the level of the lower border of the eye. Teeth small, the anterior ones larger and more caninoid than real canines. A posterior canine at corner of mouth present. Head naked, excepting above, where the scales begin behind hindmargin of eye. About 15 rows of scales before dorsal, smaller than those of the body, especially anteriorly. Similar small scales on thorax, immediately behind isthmus, but not extending as far as pectorals or ventrals, where the scales are much larger. Dorsal spines stiff and pungent. First spine equal to half diameter of eye, last spine one eye diameter and a half. Soft dorsal higher than spinous part, longest ray twice as long as eye. Dorsal truncate behind. First anal spine minute, third longest, somewhat longer than eye. Pectorals as long as head without snout. Ventrals without produced rays, as long as postorbital part of head. Caudal rounded. In a specimen of 18 mm length the body is yellowish red, with 5 longitudinal light bands, the first a median one from snout to dorsal, the second from snout along upper border of eye, third from snout to front border of eye and continued behind eye, fourth from snout along lower border of eye, fifth from chin, below eye and below base of pectoral, the last four bands faintly continued on body. Fins hyaline, dorsal with a reddish blotch between first to fifth rays. Anal with a reddish lower border, darkening into deep brown towards spinous part of fin. In a specimen of 46 mm the blotch on the dorsal is black, edged with white, forming a large ocellus. A much smaller but otherwise similar ocellus between first and second dorsal spines. Rest of fin brown. Anal very dark, almost black, with a lighter longitudinal band. Caudal light yellowish, with a faint darker median mark. Each scale of body with a brown spot, the spots forming longitudinal rows. In older specimens the body is lighter or darker brown, the head lighter. Body with dark longitudinal bands, corresponding to the rows of scales. Dorsal reddish brown, with the ocelli as described above, the posterior one as large as eye. Lighter markings as indistinct ocelli or short bars on the whole fin, which has a narrow white edge. Anal reddish brown, with a few longitudinal or somewhat oblique lighter bars. Caudal white, with a broader or narrower vertical reddish brown band, leaving a narrow outer border and a broader or narrower basal part of the fin white. Pectorals hyaline, ventrals brownish. Length over 100 mm.

Habitat: Sumatra (Kauer, Benkulen, Trussan); Simalur!; Batu Islands; Nias!; Biliton; Java (Karangbollong, Patjitan); Bawean; Celebes (Tombariri); Savu!; Timor; Ceram; Ambon; Waigeu!; New Guinea (South East Bay).—Ceylon, Andamans, Riu Kiu Islands, Philippines, Pelew Islands, New Hebrides, Queensland, Samoa, Rotuma, Guam, Society Islands. In sea on reefs.

Note. As in many other labrids, there is a striking difference in the colour pattern of the young and the adult. I have not seen transitional stages between the light striped young and the dark striped adults, but I do not doubt that Bleeker and other authors are right in considering *phaiopus* as the young of *notopsis*. The adults, which do not seem to grow to a very large size, are very much like *H. marginatus* and it might be possible that they represent a juvenile stage of this species. The chief difference is the absence of the dorsal ocelli in *marginatus*. Other differences as the ventrals being not produced in *notopsis* may be due to age. There are however specimens known of *marginatus* of a smaller size than *notopsis*, and this speaks against their identity. Still it may be possible, that they represent the two sexes of one species. Another objection is the fact, that *notopsis* is not known from the Red Sea, Mozambique or Mauritius, where *marginatus* is not uncommon.

12. **Halichoeres vroliki** (Blkr.).

Julis (*Halichoeres*) *Vroliki* Bleeker, Nat. Tijdschr. Ned. Indië VIII, 1855, p. 323.
Platyglossus Vroliki Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 285. — Atl. Ichth. I, 1862, p. 110.
Platyglossus vrolikii Günther, Cat. Brit. Mus. IV, 1862, p. 159.
Platyglossus ubayensis Cartier, Verh. Phys. Med. Ges. Würzburg V, 1873, p. 104 (fide Fowler).
Platyglossus vrolickii Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 266.

D. IX. 12. A. III. 12. P. 2. 12. V. I. 5. Ll. 28. Ltr. $\begin{array}{c}2\frac{1}{2}\\\hline 1\\\hline 9\end{array}$.

Height 3.2, 3.8 in length with caudal. Head 3.2, 3.8 in length with caudal. Height of head 1.3 in its length. Eye 5.2, twice in snout and 1.2 in slightly convex interorbital space. Mouth small, horizontal, slightly below level of lower border of eye. Maxillary not reaching to below anterior nostril. A single row of crowded teeth in the jaws, increasing in size anteriorly, the front ones in the upper jaw being canines, those of the lower jaw not so large and more caninoid. A strong canine at corner of mouth. Head naked, excepting above, where the scales begin above hindborder of eye. About 13 rows of scales before dorsal, much smaller than those of body. Similar small scales immediately behind isthmus, but those of rest of thorax much larger, only slightly smaller than those of sides of body. Dorsal spines feeble, but stiff and pungent. First spine three fourths of eye, last spine as long as snout, not shorter than longest dorsal ray. First anal spine minute, third longest, slightly longer than diameter of eye. Soft anal slightly less deep than dorsal. Both fins pointed behind. Pectorals as long as head without snout. Ventrals with the first ray produced, half length of snout shorter than head. Caudal rounded. Colour of preserved specimens reddish brown above, somewhat lighter below. Head and thorax light creamy. Four light pinkish cross bars, first below last dorsal spine, last just behind last dorsal ray, ending below on lateral line, the last only a spot. A similar less distinct spot behind it, at base of caudal. A creamy longitudinal streak on caudal peduncle. Centre of scales of body dark, forming rows of spots corresponding to the longitudinal rows of scales. A dark brown band from snout to eye, bifurcating behind eye, the upper branch to hindborder of upper part of operculum, the lower ending on operculum. At point of bifurcation a dark spot behind eye. A dark patch on opercular flap. A brown band beginning behind corner of mouth, curved over preopercle upwards, below eye and then curved downwards on operculum and suboperculum. Two brown longitudinal bands, parallel to each other, beginning below pectoral, the superior ending above origin of anal, the lower above origin of ventrals or somewhat further. Dorsal with a row of large light brown ocelli, bordered by a narrow brown line and a broader white ring, which again has a narrow brown outer border. Between each ray of dorsal one ocellus, touching the neighbouring, so that the white rings form a chain. On spinous dorsal these ocelli are less distinct, more elongate and more or less broken into oblique bars. A narrow subterminal brown line along upper part of dorsal. Each dorsal ray connected with its neighbour at its base by a semicircular narrow brown line, these lines forming a wavy longitudinal band. Anal whitish, with a crescentic brown line between the base of each pair of rays, forming a wavy line, followed downwards at a short distance by another wavy line, parallel to the other. At a distance below this last line, greater than the distance between the two basal ones, another couple of narrow parallel brown longitudinal lines, less wavy than the basal ones. Below these again two parallel lines, the interspace between these two couples of lines brown. The outer line forms a subterminal margin of the fin. Anteriorly they are less distinct than posteriorly. Caudal light, with a subterminal narrow reddish brown line and about 4 transverse rows of large reddish brown rings, one on each ray. The rings of the basal and the following row are more or less fused into vertical bands. Pectorals hyaline, creamy basally and with a black triangular spot in upper part of its base. Ventrals white, first ray dusky. Length 102 mm.

Habitat: Batu Islands; Nias!; Banka; Bawean.—Philippines. In sea.

13. **Halichoeres hoeveni** (Blkr.)

Julis (*Halichoeres*) *Hoeveni* Bleeker, Nat. Tijdschr. Ned. Indië II, 1851, p. 250.
Julis (*Halichoeres*) *chrysotaenia* Bleeker, ibid. IV, 1853, p. 488.
Platyglossus Hoevenii Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 284. — Atl. Ichth. I, 1862, p. 111.
Platyglossus hoevenii Günther, Cat. Brit. Mus. IV, 1862, p. 153.
Platyglossus chrysotaenia Günther, ibid. p. 154.
Platyglossus hoevenii Günther, Fische der Südsee III, 1909, p. 268.
Platyglossus hoeveni Jordan & Seale, Bull. Bur. Fish. XXV (1905), 1906, p. 300.

Halichoeres hoevenii Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 268.
Halichoeres hoevenii Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 340.
Halichoeres hoeveni Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 307.

D. IX. 12—13. A. III. 12—13. P. 2. 12. V. I. 5. Ll. 27—28.

Ltr. $\dfrac{\dfrac{2 + (1-2) \times \frac{1}{2}\ ^{1)}}{1}}{9}$.

Height 3.2—3.3, 3.8—4 in length with caudal. Head 3.3—3.5, 4 in length with caudal. Height of head 1.1—1.3 in its length. Eye 4.5—5.2, 1.7—1.8 in snout and 1.2—1.4 in slightly convex interorbital space. Mouth small, nearly horizontal, slightly below level of lower border of eye. Maxillary not reaching to below anterior nostril. A single series of crowded teeth in the jaws, increasing in size anteriorly, the front ones caninoid, conical in the upper jaw, slender and more pointed in the lower jaw. Head naked, excepting above, where the scales begin above middle of eye. About 17 rows of scales before dorsal, these scales much smaller than those of body. Similar small scales on thorax, from isthmus to about half way ventrals. Dorsal spines stiff and pungent. First spine as long as eye, last as long as snout, not shorter than longest dorsal ray. Dorsal somewhat pointed behind. First anal spine very small. Third spine longest, about equal to one eye diameter and a half. Soft anal similar to soft dorsal. Pectorals slightly longer than postorbital part of head. Ventrals with the first ray somewhat produced, as long as pectorals. Caudal slightly rounded, almost truncate with rounded edges. Colour of preserved specimens reddish brown, lighter below, with about 11—12 white or pinkish longitudinal bands, continued on head, the 5 upper ones above eye, sometimes bifurcating here and on body before dorsal. Two of these bands from snout through eye, with two vertical connections on snout, the 4 inferior ones on cheek and chin. Dorsal whitish, with three longitudinal reddish bands, wavy on soft portion of fin and here often forming loops, more or less encircling a large black white edged ocellus between first to third dorsal rays. A much smaller ocellus between first and second spines. In old specimens these ocelli may get very faint. A large black white edged ocellus on upper part of caudal peduncle, near base of caudal. Anal with three reddish bands, forming loops or broken into ocelli posteriorly. Caudal yellowish, with or without vertical rows of rather large

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1) There are two rows of scales above the Ll. and one or two rows of small or incomplete scales, forming the scaly sheath of the fin.

reddish spots. Pectorals and ventrals hyaline, with or without a brown triangular patch superiorly at base of pectoral. A more or less distinct brown longitudinal streak behind eye and sometimes also a similar spot immediately before eye. Length 110 mm. (Specimens of Bleeker's collection in the Amsterdam Museum examined).

Nomen indig. Ikan kodja (Malay Batavia).

Habitat: Sumatra (Siboga, Padang!); Nias; Banka; Java (Batavia); Bawean; Celebes (Makassar); Flores; Solor; Timor; Buru; Ceram; Obi; Ternate; Halmahera; Ambon; Haruko; Nusa Laut; Goram; Banda; Kei Islands; New Guinea (Hood Bay).— Philippines, Pelew Islands, Solomon Islands, New Hebrides, Fiji, Samoa, Society Islands. In sea and reefs. "This fish travels in schools, similar to *Caesio*" (Fowler & Bean).

Note. Günther separated *chrysotaenia* from this species, after that Bleeker had united it with *hoeveni*. Bleeker based *chrysotaenia* on a single specimen from Batavia, which is now in the British Museum (the habitat given by Günther l.c. "Java and Sumatra" is erroneous). It differs from normal *hoeveni* in having one ray more in the dorsal and anal, which is not sufficient, and certainly not with only one specimen at hand, to base a new species on. The bifurcating of the bands of the body anteriorly occurs also, perhaps in a less degree, in normal specimens of *hoeveni* and the presence of an axillary spot is no regular feature of this species. I think therefore that Bleeker was right in withdrawing his *chrysotaenia*.

14. **Halichoeres solorensis** (Blkr.).

Julis (*Halichoeres*) *solorensis* Bleeker, Nat. Tijdschr. Ned. Indië V, 1853, p. 86.
Halichoeres solorensis Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 289. Atl. Ichth. I, 1862, p. 116.
Platyglossus solorensis Kner, Novara Exp. Fische II, 1865, p. 255.
Halichoeres solorensis Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 278.
Halichoeres solorensis Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 342.

D. IX. 12. A. III. 12. P. 2. 12. V. I. 5. Ll. 28. Ltr. $\begin{array}{c}2\\ \hline 1\\ \hline 9\end{array}$.

Height 3,4, 4 in length with caudal. Head 3.2, 3.7 in length with caudal. Height of head 1.4 in its length. Eye 5.7, 1.8 in snout and 1.2 in almost flat interorbital space. Mouth moderate, nearly horizontal, half diameter of eye below level of lower border of eye. Lips plated, the inner plate crenulated. Teeth pointed, somewhat curved, increasing in length anteriorly, the two front teeth in both jaws canines. Maxillary reaching to below anterior nostril. Head naked, excepting above, where the scales begin slightly behind hindmargin of eye. About 11 rows of scales before dorsal, these scales, especially anteriorly, much smaller than those of the sides of the body. Similar small scales immediately behind isthmus. Dorsal spines feeble, pungent. First and second spines slightly divergent. First spine shorter than snout, third spine and last spine as long as snout. Soft dorsal as high as spinous part, somewhat pointed behind. First anal spine minute, third longest, as long as first dorsal spine. Soft anal similar to soft dorsal. Pectorals and ventrals, with the first and second rays produced, subequal and slightly less than head without snout. Caudal rounded. Colour of preserved specimen brown, somewhat lighter below. Operculum silvery. A faint band from snout to eye, another behind eye and a third from corner of mouth below eye to opercle. A small dark spot behind eye. Dorsal hyaline, with dusky markings on soft part of fin. A large deep black ocellus between first to third dorsal spines. A smaller and lighter one may be present between 5th and 6th rays, but not present in the specimen examined by me. Anal hyaline. Caudal whitish, with a small brown spot at the base of some of the supra median rays. Pectorals and ventrals hyaline. A triangular dark brown spot superiorly at base of pectorals. Description made after a specimen of 97 mm, the longest specimen known.

Habitat: Ceram; Ambon!; Solor; Timor.—Philippines, Marquesas Islands. In sea.

15. **Halichoeres bicolor** (Bl. Schn.)

Labrus bicolor Bloch Schneider, Syst. Ichth. 1801, p. 267.
Julis mola Cantor, Journ. Asiat. Soc. Bengal XVIII, 1850, p. 1220 (partim).
Julis (*Halichoeres*) *margaritophorus* Bleeker, Nat. Tijdschr. Ned. Indië IV, 1853, p. 487.
Julis (*Halichoeres*) *Cantori* Bleeker, Versl. Akad. Amsterdam XII, 1861, p. 70.
Halichoeres bicolor Bleeker, ibid. XIII, 1862, p. 285. Atl. Ichth. I, 1862, p. 118.
Platyglossus bicolor Günther, Cat. Brit. Mus. IV, 1862, p. 145.
Choerojulis bicolor von Martens, Preuss. Exp. Ost-Asien I, 1876, p. 397.
Halichoeres bicolor Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 282.
Halichoeres bicolor Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 342.

D. IX. 12 (13). A. III. 12 (13). P. 2. 11—12. V. I. 5. Ll. 27. Ltr. $\begin{array}{c} 2-2\frac{1}{2} \\ \hline 1 \\ \hline 10 \end{array}$.

Height 3.3—3.4, 3.9—4.1 in length with caudal. Head 3—3.1, 3.6—3.7 in length with caudal. Height of head 1.4 in its length. Eye 5.7—6.2, 2—2.2 in snout and 1.4—1.7 in convex interorbital space. Mouth moderate, somewhat oblique. Corner of mouth half diameter of eye below level of lower border of eye. Maxillary almost reaching to below anterior nostril. Lips thick, plated, the inner plate crenulated. Teeth conical, the two anterior ones in the upper jaw and in the lower jaw moderate canines. Head naked, excepting above, where the scales begin above hindmargin of eye. About 11 rows of scales before dorsal, these scales much smaller than those of body. Similar small scales on thorax immediately behind isthmus. Scales of belly smaller than those of sides of body. Dorsal spines stiff and pungent. The first about equal to eye, the second scarcely shorter than third, which is as long as snout. Spines decreasing in length posteriorly but the 9th as long as the 3rd. Soft dorsal not higher than spinous part, truncated behind. First anal spine minute, third longest, slightly shorter than snout. Soft anal similar to soft dorsal. Pectorals and ventrals with the first ray produced, about one half diameter of eye longer than postorbital part of head. Caudal rounded. Colour of preserved specimens creamy. A dark blue median band on snout, bifurcating on temporal region, the upper branch ending below anterior part of dorsal, the lower branch continued along base of dorsal to upper part of caudal peduncle. In their anterior course these bands often broken into rows of spots. A similar but broader band from snout through eye to base of median caudal rays, broadest above pectorals. Behind eye this band may be broken into a vertical bar immediately behind eye and two horizontal bars behind it. A narrow white streak along lower border of eye. A more or less curved light blue short band on cheek and another along hindborder of opercle. These bands not always distinct. Dorsal pale vinous, with a white edged ocellus between the 6th and 7th spines and a large black patch between the 7th to the 9th spines. A white median band on spinous part of dorsal before the ocellus not always distinct. Sometimes this band forms the curved edge of a semilunar vinous patch between the 5th to 9th spines and includes the ocellus and the black band mentioned above. A row of round white spots at base of soft dorsal, each spot between two rays. A median faint darker vinous longitudinal band and a narrow subterminal band. Sometimes a second row of white spots or small white ocelli between these bands. Basal half of anal white, outer half vinous mottled with darker. Sometimes two very narrow parallel longitudinal lines on the white basal part. Caudal uniform yellowish or with faint transverse markings. Pectorals and ventrals yellowish. A small triangular dark patch superiorly at base of pectorals. Length 133 mm.

Habitat: Singapore; Java (Batavia); Borneo (Sandakan); Celebes (Makassar!); Ambon; Waigeu! — Pinang, Philippines. In sea.

16. **Halichoeres nigrescens** (Bl. Schn.)

Labrus nigrescens Bloch Schneider, Syst. Ichth. 1801, p. 263.
Julis Dussumieri Cuvier & Valenciennes, Hist. Nat. Poissons XIII, 1839, p. 478.
Julis exornatus Richardson, Rep. Brit. Ass. Adv. Sc., (1845) 1846. Ichth. China, p. 258.
Julis (Halichoeres) notophthalmus Bleeker, Verh. Bat. Gen. XXII, 1849. Overz. Gladsch. Labr., p. 20.
Julis dussumieri Cantor, Journ. Asiat. Soc. Bengal XVIII, 1850, p. 1218.
Julis (*Halichoeres*) *notophthalmus* Bleeker, Verh. Bat. Gen. XXV, 1853. Nalez. ichth. fauna Hindustan, p. 54.
Julis (*Halichoeres*) *mola* Bleeker, Acta Soc. Sc. Indo-Neerl. VI, 1859, p. 98.
Halichoeres nigrescens Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 287. — Atl. Ichth. I, 1862, p. 118.
Platyglossus dussumieri Günther, Cat. Brit. Mus. IV, 1862, p. 143.
Platyglossus dussumieri Kner, Novara Exp. Fische I, 1865, p. 254.
Choerojulis Dussumieri von Martens, Preuss. Exp. Ost-Asien I, 1876, p. 397.
Platyglossus dussumieri Day, Fishes of India, Prt. 3, 1877, p. 399.
Platyglossus Dussumieri Macleay, Proc. Linn. Soc. New S. Wales II, 1878, p. 362. — Descr. Cat. Austr. Fish I, 1881, p. 95.
Platyglossus dussumieri Regan, Journ. Bombay Nat. Hist. Soc. XVI, 1905, p. 330, p. 332.
Halichoeres nigrescens Jordan & Seale, Bull. Bur. Fish. XXVI, (1906) 1907, p. 29.
Halichoeres nigrescens Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 280.
Halichoeres nigrescens Fowler, Hongkong Naturalist II, 1931, p. 308.

D. IX. 12 (13). A. III. 12 (13). P. 2. 13. V. I. 5. Ll. 28. Ltr. $\begin{array}{c} 2\frac{1}{2} \\ \hline 1 \\ \hline 9 \end{array}$.

Height 3.2, 3.8 in length with caudal. Head 3.3, 4 in length with caudal. Height of head 1.2 in its length. Eye 5.6, 1.8 in snout and 1.2 in slightly convex interorbital space. Mouth moderate, nearly horizontal. Corner of mouth almost one eye diameter below level of lower border of eye. Maxillary not reaching to below anterior nostril. Lips thick, plated. Teeth conical, somewhat curved, the two anterior ones in the upper jaw long, more pointed, directed forwards and canines. The two anterior ones in the lower jaw caninoid. A strong posterior canine at corner of mouth. Head naked, excepting above, where the scales begin above hinder part of eye. About 11—12 rows of scales before dorsal, these scales much smaller than those of the body. Similar small scales between isthmus and ventrals. Scales of belly somewhat smaller than those of sides. Dorsal spines stiff and pungent, first as long as eye, second slightly shorter than snout, third as long as snout, following spines slightly decreasing in size, but the last spine as long as the third. First and second spines divergent. Soft dorsal higher than spinous part, the longest equal to snout and eye together. Dorsal pointed behind. First anal spine minute, third longest, slightly less than snout. Soft anal somewhat less deep than soft dorsal, pointed behind. Pectorals as long as head without snout. Ventrals pointed, the first ray slightly produced, equal to postorbital part of head. Caudal rounded. Colour of preserved specimens dark reddish brown, operculum lighter. Indications of dark longitudinal bands on the body, and of 4 or 5 darker blotches on the sides. A bluish band from eye to snout, another from end of maxillary to below eye. A bluish arc on opercle and usually several postocular bluish blotches. Dorsal dusky, with a dark ocellus on membranes between fifth and sixth spines and on posterior part of membranes between fourth and fifth spines. One or more rows of white round blotches or ocelli on soft dorsal. Anal with basal row of whitish spots and subbasal longitudinal whitish streak. Caudal brownish, spotted with paler and with the edges of the fin above and below broadly whitish. Pectorals and ventrals hyaline or brownish. A dark triangular blotch superiorly at base of pectorals. Length 140 mm. (A specimen of Bleeker's collection in the Leiden Museum seen by me).

Habitat: Singapore; Sumatra (Padang, Tiku); Banka; Biliton; Java (Batavia!, Karangbollong, Japara); Madura!; Celebes (Makassar, Badjo); Buru; Timor. — Zanzibar, Persian Gulf, Coasts of British India, Burma, Penang, Tonkin, Indochina, Japan, China, Formosa, Philippines, North Australia. In sea.

17. **Halichoeres papilionaceus** (C. V.)

Julis papilionaceus Cuvier & Valenciennes, Hist. Nat. Poissons XIII, 1839, p. 484.
Julis (*Halichoeres*) *Schwarzii* Bleeker, Verh. Bat. Gen. XXII, 1849. Bijdr. ichth. fauna Bali, p. 7.
Julis (*Halichoeres*) *dieschismenacanthus* Bleeker, Nat. Tijdschr. Ned. Indië III, 1852, p. 645.
Julis (*Halichoeres*) *dieschismenacanthoides* Bleeker, ibid. IV, 1853, p. 121.
Halichoeres Schwarzi Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 288. — — Atl. Ichth. I, 1862, p. 117.
Platyglossus schwarzii Günther, Cat. Brit. Mus. IV, 1862, p. 149.
Platyglossus (*Halichoeres*) *Doleschalli* Steindachner, Verh. zool. bot. Ges. Wien XIII, 1863, p. 1190.
Platyglossus (*Halichoeres*) *schwarzii* Steindachner, ibid. XIV, 1864, Taf. II, Fig. 2.
Choerojulis Schwarzi von Martens, Preuss. Exp. Ost-Asien 1876, p. 397.
Halichoeres papilionaceus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 278.
Halichoeres papilionaceus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 342.

D. IX. 11 (12). A. III. 11. P. 2. 12. V. I. 5. Ll. 28—29.

Ltr. $\begin{array}{c} 2-2\frac{1}{2} \\ \hline 1 \\ \hline 9-10 \end{array}$.

Height 3—3.5, 3.6—4.2 in length with caudal. Head 3.3—3.4, 4 in length with caudal. Height of head 1.2—1.3 in its length. Eye 4.6—6.2, 1.5—2.2 in snout and 1.1—1.6 in almost flat interorbital space. Mouth moderate, somewhat oblique. Maxillary not reaching quite to below anterior nostril. Lips thick, plated. Corner of mouth almost one eye diameter below level of lower border of eye. Teeth conical, the two anterior ones in both jaws canines, the following pair not much shorter, curved, the teeth decreasing gradually in length posteriorly. Head naked, excepting above, where the scales begin above hinder part of eye or behind eye. About 10—12 rows of scales before dorsal, these scales much smaller than those of the body. Similar small scales on thorax, between isthmus and ventrals. Scales on belly conspicuously smaller than those of sides of body. Dorsal spines stiff and pungent; the first about one eye diameter and a half, the second half diameter of eye longer than snout, the following spines slightly decreasing in length but the ninth again as long as the second. First and second spines divergent. Soft dorsal higher than spinous part, the longest ray equal to snout and eye together. Dorsal somewhat pointed behind. First anal spine minute, third longest, about as long as first dorsal spine. Anal similar to soft dorsal but somewhat lower. Pectorals half diameter of eye longer than postorbital part of head. Ventrals without produced rays, equal to postorbital part of head. Caudal rounded. Colour of preserved specimens pinkish or light brown, lighter below. Head with a lighter or darker bluish band, often bordered by narrow black lines, running from snout to eye. A similar band below eye, running obliquely on preopercle and connected or not with another vertical band behind eye. Two narrower bands from snout to interorbital space, where they get sinuated or even form a loop, and are then continued in a straight line to origin of dorsal. A band along hindborder of operculum may be present. Two or three bands running obliquely upwards on opercle, connected or not with the vertical band behind eye and continued on anterior part of body to below the sixth dorsal spine. They are followed on the sides of the body by a series of about five broad cross bars or patches. In some cases these patches are connected by longitudinal bands, which are a continuation of those on anterior part of body. Lower half of sides and belly without patches or bands, but a faint band is often present above anal, getting more distinct on caudal peduncle. Dorsal yellowish or pinkish, with a broad median bluish band, which darkens to black between the 4th—6th spines, forming a conspicuous blotch. This band is bordered above and below by a white narrower band on spinous dorsal; these bands are gradually dissolved into rows of white round spots, bordered by a narrow dark line and thus forming a row of ocelli above and below the median band on soft dorsal. One or two rows of smaller ocelli above the upper row. Anal with similar rows of ocelli and a light, black lined median band. These markings not always very distinct. Caudal light yellowish, with a broad black terminal transverse band, which may be developed on the median part of the fin only or even totally wanting. Pectorals and ventrals light creamy or brownish. Length 125 mm.

Habitat: Singapore; Sumatra (Benkulen); Nias!; Lepar; Bawean; Borneo (Bontang!); Madura!; Bali!; Celebes (Menado!); Halmahera; Ternate; Batjan; Buru; Ceram; Ambon; Saparua; Nusa Laut!; Banda!; Solor; Timor; Kei Islands!; Waigeu!. — Philippines, Pelew Islands, Santa Cruz Islands. In sea.

18. **Halichoeres xanti** (Karoli)

Platyglossus Xanti Karoli, Termeszetrajzi Füzetek V, 1882, p. 174.

D. IX. 12. A. III. 11. P. 2. 11. V. I. 5. Ll. 28.

Height $4^1/_3$. Head $3^1/_2$. Height of head $1^1/_2$ in its length. Eye $3^1/_2$, $^3/_4$ in interorbital space. Rostro-frontal profile convex. Snout not longer than eye. Maxillary not reaching to below eye, $3^1/_2$ in length of head. Teeth conical, acute. Four large curved canines anteriorly in the upper jaw, the median pair larger than the other two. Dorsal spines not divergent, increasing in size posteriorly, the last one longest, less than half height of body. Soft dorsal slightly higher than spinous part, pointed behind. Pectorals $5^1/_2$, ventrals 7 in length. Caudal rounded. Colour red above, pinkish margaritaceous below. Two longitudinal bands from head to caudal below lateral line. An oblong blackish violet patch behind eye. An oblong black blotch between first to fourth dorsal spines, a similar black blotch between first to third dorsal rays and a black blotch at end of dorsal. A white edged black ocellus at base of caudal. Length of single specimen known 56 mm. (Not seen by me, copied after Karoli.)

Habitat: Singapore.

19. **Halichoeres leparensis** (Blkr.) (Fig. 34. C. p. 231)

Julis (Halichoeres) leparensis Bleeker, Nat. Tijdschr. Ned. Indië III, 1852, p. 730.
Halichoeres leparensis Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 287. — Atl. Ichth. I, 1862, p. 119.
Platyglossus leparensis Günther, Cat. Brit. Mus. IV, 1862, p. 156.
Platyglossus leparensis Day, Fishes of India, Prt. 3, 1877, p. 399.
Halichoeres leparensis Seale, Occas. Papers B. P. Bishop Mus. I, 1901, p. 89.
Platyglossus leparensis Günther, Fische der Südsee III, 1909, p. 268.
Platyglossus leparensis M. Weber, Siboga Exp. Fische 1913, p. 374.
Halichoeres leparensis Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 283.
Halichoeres leparensis Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 342.

D. IX. 12 (13). A. III. 12 (13). P. 2. 12. V. I. 5. Ll. 28. Ltr. $\frac{\frac{2}{1}}{8-9}$.

Height 3.2—3.4, 3.8—4.1 in length with caudal. Head 3—3.4, 3.6—4 in length with caudal. Height of head 1.1—1.4 in its length. Eye 4—4.7, 1.2—1.7 in snout and equal to or somewhat more than slightly convex interorbital space. Mouth moderate, slightly oblique. Corner of mouth less than half diameter of eye below level of lower border of eye. Lips thick, plated. Maxillary reaching almost to below anterior nostril. Teeth conical or somewhat pointed, increasing in length anteriorly, the anterior pair in both jaws canines. A strong canine at corner of mouth. Head naked, excepting above, where the scales begin above hindborder of eye. About 12 rows of scales before dorsal; these scales much smaller than those of sides of body. Similar small teeth between isthmus and base of ventrals. Dorsal spines stiff and pungent. First spine about three fourths of eye. Spines increasing in length posteriorly, the last one about one eye diameter and a half. Soft dorsal somewhat higher than spinous part, the longest rays twice as long as eye. First anal spine minute, third longest, about one eye diameter and a half. Soft anal slightly less deep than dorsal, both fins somewhat pointed behind. Pectorals as long as head without snout. Ventrals slightly shorter. Caudal rounded. Colour of preserved specimens lighter or darker brown. Body with about 4 dark cross bars, formed by dark patches on the base of the scales and interrupted by the lateral line, the scales of which are without patch. Below the lateral line the dark colour often spreads along the margin of the scales, giving to the sides a reticulated appearance. A various number of scales of the sides and the belly have a silvery centre, forming more or less developed silvery longitudinal bands or rows of spots, generally best developed on body. The thorax often uniformly silvery. These silvery colours disappear in specimens preserved in formaline. Head with a dark vertical bar behind eye. A dark band from eye to snout. Cheeks and opercular region with curved silvery bands and spots, finely bordered with dark brown. These disappear in formaline specimens, where a large black blotch on opercle, a dark streak above it and a few oblique dark streaks on cheeks are clearly shown, which markings are obscured in alcohol specimens by the silvery bands and spots. Dorsal greyish, with rows of dark edged white ocelli. A small black white edged ocellus between first and second spines and a much larger one between second and third or first and third rays. Anal with similar rows of ocelli, which may be confluent into a longitudinal white band anteriorly. A black spot or white edged ocellus at base of supra median caudal rays. Caudal yellowish or hyaline, more or less dusky or blackish towards its extremity. Pectorals and ventrals hyaline, the latter sometimes with a dusky streak. No dark streak at base of pectorals. Length 88 mm.

Habitat: Singapore; Sumatra (Trussan, Padang); Nias!; Pulu Nako!; Lepar; Biliton; Java (Batavia!, Karangbollong, Patjitan, Prigi); Madura!; Bawean; Celebes (Menado); Basa Reef in Gulf of Boni; Siau!; Talaut Islands!; Buru; Ternate; Ambon;

Saparua; Goram; Timor; Solor!; Banda!; Kei Islands!; New Guinea (South East Bay, Fr. Wilhelmshafen). — Andamans, Nikobars, Philippines, Pelew Islands, Guam, New Caledonia. In sea.

20. **Halichoeres binotopsis** (Blkr.)

Julis (Halichoeres) binotopsis Bleeker, Verh. Bat. Gen. XXII, 1849. Bijdr. ichth. Bali, p. 7.
Halichoeres binotopsis Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 285. — Atl. Ichth. I, 1862, p. 120.
Platyglossus binotopsis Günther, Cat. Brit. Mus. IV, 1862, p. 153.
Choerojulis binotopsis von Martens, Preuss. Exp. Ost-Asien I, 1876, p. 397.
Halichoeres binotopsis Jordan & Seale, Bull. Bur. Fish. XXVI, (1906), 1907, p. 29.
Platyglossus binotopsis M. Weber, Siboga Exp. Fische 1913, p. 372.
Platyglossus binotopsis de Beaufort, Bijdr. Dierkunde, Afl. XIX, 1913, p. 131.
Halichoeres binotopsis Fowler, Proc. Acad. Nat. Sc. Philadelphia LXXXVI, 1934, p. 79.
?*Halichoeres binotopsis* Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 310.

D. IX. 11 (12). A. III. 11 (12). P. 2. 12. V. I. 5. Ll. 27—29. Ltr. $\begin{array}{c}2\\\hline 1\\\hline 9\end{array}$.

Height 3.3—3.4, 4 in length with caudal. Head 3—3.3, 3.6—4 in length with caudal. Height of head 1.3—1.5 in its length. Eye 5—5.4, 1.7—2 in snout and 1.1 in slightly convex interorbital space. Mouth moderate, horizontal or slightly oblique. Corner of mouth less than half diameter of eye below level of lower border of eye. Lips thick, plated. Teeth conical or somewhat pointed, increasing in length anteriorly, the anterior pair in both jaws canines, but not much longer than the next pair. A canine at corner of mouth. Head naked, excepting above, where the scales begin above hindmargin of eye. About 10 rows of scales before dorsal. Dorsal spines stiff and pungent, the first as long as eye, the following spines slightly increasing in length posteriorly, the ninth spine about twice diameter of eye. Soft dorsal slightly higher than spinous part, pointed or slightly rounded behind. First anal spine minute, third longest, somewhat longer than eye. Soft anal similar to soft dorsal. Pectorals equal to head without snout. Ventrals without produced rays, equal to snout and half diameter of eye together. Caudal rounded. Colour of preserved specimens yellowish or light yellowish brown, belly and inferior part of head lighter, often with a silvery hue. Body crossed by 5 or 6 dark transverse bands, formed by dark spots on centre or along the border of the scales and giving to the bands a reticular aspect. Faint traces of narrow light longitudinal bands. Head with a dark brown band from snout to eye and a vertical brown stripe behind eye. Traces of light longitudinal bands on opercle and below eye from preopercle to lower part of opercle. Sometimes these bands have a slight silvery hue. A dark brown stripe along base of pectorals. Dorsal greyish, with two rows of white round spots, the rows arranged in such a way that the grey interspaces form narrow oblique transverse somewhat wavy bands. A black spot between the first and second spines and a much larger one between second and third rays, generally somewhat extending anteriorly before second ray, bordered by white and again by grey. Anal uniform hyaline or whitish, sometimes a dark oblique streak between third and fourth rays. A small black spot superiorly at base of caudal. Caudal hyaline, the rays white or dusky, the fin sometimes with a dusky shade towards its end. Pectorals and ventrals hyaline, ventrals sometimes with a longitudinal dusky streak. Length 87 mm (a specimen of Bleeker's collection in the Amsterdam Museum examined).

Habitat: Singapore; Java (Patjitan); Bawean; Borneo (Bontang!); Bali; Celebes (Menado); Halmahera; Ternate; Ceram; Ambon; Nusa Laut!; Goram; Flores!; Solor; Timor; Waigeu!. — Philippines, Pelew Islands, Kandavu Islands, Banks Group, New Hebrides, Fiji?. In sea.

Note. Very close to *leparensis,* but distinguishable by having one ray less in the dorsal and anal and by having a dark streak at base of pectorals, which may however be wanting according to Bleeker. We doubt if the specimen described by Herre l.c. from Fiji, belong to this species, as the author does not mention the ocellus on the soft dorsal.

21. **Halichoeres miniatus** (C. V.)

Julis miniatus Cuvier & Valenciennes, Hist. Nat. Poissons XIII, 1839, p. 460.
Julis (*Halichoeres*) *miniatus* Bleeker, Verh. Bat. Gen. XXII, 1849. Ichth. Bali, p. 8.
Halichoeres miniatus Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 287. — Atl. Ichth. I, 1862, p. 114.
Platyglossus miniatus Günther, Cat. Brit. Mus. IV, 1862, p. 150.
Choerojulis miniata von Martens, Preuss. Exp. Ost-Asien I, 1876, p. 397.
Platyglossus miniatus Macleay, Descr. Cat. Austral. Fish. II, 1881, p. 95.
Halichoeres (*Octocynodon*) *miniatus* Fowler, Journ. Acad. Nat. Sc. Philadelphia (2) XII, Prt. 4, 1904, p. 535.
Halichoeres miniatus Jordan & Seale, Bull. Bur. Fish. XXVI, (1906) 1907, p. 30.

Halichoeres miniatus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 270.
Halichoeres miniatus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 341.
Octocynodon miniatus Whitley, Brit. Mus. Great Barrier Reef Exp. IV, N° 9, 1932, p. 294.
Halichoeres miniatus Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 314.

D. IX. 11—12. A. III. 11—12. P. 2. 11. V. I. 5. Ll. 28. Ltr. $\begin{array}{c}1\frac{1}{2}\\ \hline 1\\ \hline 9\end{array}$.

Height 3.2—3.9, 3.9—4.8 in length with caudal. Head 2.7—3.1, 3.3—3.8 in length with caudal. Height of head 1.4—1.5 in its length. Eye 4—5, 1.5—1.7 in snout, equal to or somewhat more than almost flat interorbital space. Mouth moderate, nearly horizontal, more than half eye diameter below level of lower border of eye. Maxillary reaching to below anterior nostril. Lips plated, the inner plate crenulated. Teeth pointed, the four anterior ones in the upper jaw canines, the front pair longest and somewhat directed forwards, the outer pair strongly curved backwards. Two slender canines anteriorly in the lower jaw. Head naked, excepting above, where the scales begin above hindmargin of eye. About 10 rows of scales before dorsal, these scales much smaller than those of the body. Similar small scales immediately behind isthmus. Dorsal spines stiff and pungent, three fourths of eye. Last spine equal to snout, longest ray somewhat longer. Dorsal truncated or slightly rounded behind. First anal spine minute, third as long as eye. Soft anal similar to soft dorsal. Pectorals as long as head without snout or slightly longer .Ventrals without produced rays equal to snout and eye. Caudal rounded. Colour of preserved specimens light pinkish. About 5 dark patches below dorsal, formed by groups of scales having a broad dark hindborder. Scales of sides also with dark hindborders in a various degree, forming a row of large more or less distinct dark patches. Some of these scales and often also a scale between the blotches at base of dorsal with a silvery white centre, which is always present in those of the belly. As these spots are elongate, they form vertical or somewhat oblique silvery white lines. Head with dark spots above. A vertical dark stripe behind, and a dark spot before eye. A silvery white line from corner of mouth, running below eye across preopercle, to opercle, where it abruptly bents down and may be continued again forwards, ending on lower lip, so as to form a complete loop. A dark spot, followed by a silvery spot, just above opercle and behind vertical stripe behind eye. Dorsal light with black narrow oblique cross bands, more or less dissolved into rows of spots anteriorly. A small dark ocellus between first and second spines and somewhat larger ones between first and second and second and third rays. Sometimes these lastnamed spots are confluent or one of the spots only is present. Anal hyaline, with several longitudinal rows of black spots, the outer row consisting of larger spots. Pectorals and ventrals hyaline. Length 83 mm.

Habitat: Sumatra (Kauer, Priaman, Siboga, Trussan, Padang, Benkulen); Batu Islands; Java (Patjitan, Prigi, Karangbollong); Bawean; Borneo; Celebes (Menado, Tombariri); Siau!; Talaut Islands!; Solor; Sawu!; Timor; Ambon; Ternate Kei Islands!. — Madagascar, Philippines, China, Queensland, New Hebrides, Fiji. In sea.

Note. See note below *H. margaritaceus.*

22. **Halichoeres margaritaceus** (C. V.)

Julis margaritaceus Cuvier & Valenciennes, Hist. Nat. Poissons XIII, 1839, p. 484.

Julis (*Halichoeres*) *pseudominiatus* Bleeker, Acta Soc. Sc. Indo-Neerl. I, 1856, Beschr. visch. Amboina, p. 62.

Halichoeres pseudominiatus Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 288. — Atl. Ichth. I, 1862, p. 115.

Platyglossus opercularis Günther, Cat. Brit. Mus. IV, 1862, p. 148. — Fishes of Zanzibar 1866, p. 95.

Halichoeres opercularis Seale, Occas. Papers B. P. Bishop Mus. I, 1901, p. 89.

Halichoeres opercularis Jordan & Seale, Bull. Bur. Fish. XXV, (1905) 1906, p. 302.

Halichoeres margaritaceus Jordan & Seale, l.c.

Halichoeres pseudominiatus Jordan & Seale, ibid. XXVI, (1906) 1907, p. 30.

Halichoeres opercularis Jordan & Richardson, ibid. XXVII, (1907) 1908, p. 267.

Platyglossus opercularis Günther, Fische der Südsee III, 1909, p. 264.

Halichoeres opercularis Snyder, Proc. U. S. Nat. Mus. XLII, 1912, p. 421, p. 507.

Platyglossus pseudominiatus Barnard, Ann. S. Afric. Mus. XXI, 1925—1927, p. 752.

Halichoeres opercularis Whitley, Austr. Zoologist IV, Prt. IV, 1926, p. 232.

Halichoeres margaritaceus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 271.

Halichoeres margaritaceus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 341.

Octocynodon margaritaceus Whitley, Brit. Mus. Great Barrier Reef Exp. IV, N° 9, 1932, p. 294.

Halichoeres opercularis Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 315.

D. IX. 11. A. III. 11. P. 2. 11—12. V. I. 5. Ll. 28. Ltr. $\dfrac{1\frac{1}{2}-2\frac{1}{2}}{\dfrac{1}{9}}$.

Height 3—3.3, 3.7—4 in length with caudal. Head 2.6—3, 3.2—3.7 in length with caudal. Height of head 1.3—1.4 in its length. Eye 4—5, 1.3—1.7 in snout and 1—1.2 in slightly convex interorbital space. Mouth moderate, nearly horizontal, half diameter of eye or less below level of lower border of eye. Maxillary reaching to below anterior nostril. Lips plated, the inner plate crenulated. Teeth pointed, the four anterior ones in the upper jaw canines, the front pair longest and somewhat curved, the outer pair shorter and more curved. Two moderate canines anteriorly in the lower jaw. Head naked, excepting above, where the scales begin behind hindmargin of eye. About 10 rows of scales before dorsal; these scales much smaller than those of the body. Similar small scales on thorax, immediately behind isthmus. Dorsal spines stiff and pungent, the first about equal to eye, the longest as long as snout, of about the same length as the longest dorsal rays. Dorsal truncate or slightly rounded behind. First anal spine minute, third longest, somewhat longer than eye. Pectorals about as long as head without snout, ventrals without produced rays, somewhat less than eye and snout together. Caudal rounded. Colour of preserved specimens light pinkish, lighter below. Some of the scales of sides with a dark hindborder; groups of such scales may form dark patches or cross bands or suggest a broad longitudinal band. Sometimes a number of scales have a silvery white centre, forming light spots scattered on the sides and back. Anteriorly, about above ventrals, these spots are elongate and form almost vertical narrow silvery white stripes. Head with a dark vertical stripe behind eye and a dark spot before it. A silvery white patch on upper part of opercle. Small silvery white spots here and there on upper part of head. A silvery white band, narrowly bordered by dark, from corner of mouth below eye to opercle, forming a loop downwards here and continued again forwards to lower lip. Dorsal hyaline, with almost vertical brown bands which are often bifurcate. A small dark ocellus between first and second spines, rarely wanting, and a much larger one on third dorsal ray, extending on membranes between first and second and second and third. Anal hyaline, without spots. Caudal, pectorals, and ventrals hyaline or light yellowish. Axil of pectoral often silvery white. Length 100 mm.

Habitat: Sumatra (Priaman, Trussan); Java (Prigi, Karangbollong, Patjitan); Bawean; Celebes (Menado); Talaut Islands!;

Sula Islands!; Binongka!; Flores; Ambon; Nusa Laut!; Tiur!; Rotti!; Timor; Kei Islands! — Coast of Natal, Island of Johanna (Zanzibar), Japan, Riu Kiu Islands, Philippines, Pelew Islands, Solomon Islands, Queensland, Lord Howe Island, Norfolk Island, New Hebrides, Fiji, Samoa, Rotuma. In sea on reefs.

Note. This species differs only from *miniatus* in the absence of spots on the anal. Bleeker believed that *miniatus* had P. 2.11 and *margaritaceus* P. 2.12, but among seven specimens of *margaritaceus* I found once P. 2.12, in the other ones P. 2.11, as in all specimens of *miniatus*. I doubt if the two species are different.

23. **Halichoeres nebulosus** (C. V.)

Julis nebulosus Cuvier & Valenciennes, Hist. Nat. Poissons XIII, 1839, p. 461.
Julis poecila Lay & Bennett, Zool. Beechy's Voyage 1839, p. 66.
Julis (Halichoeres) harloffii Bleeker, Verh. Bat. Gen. XXII, (1847) 1849, Gladsch. Labr., p. 22.
Julis (Halichoeres) Reichei Bleeker, Acta Soc. Sc. Indo-Neerl. III, 1858. 6. Bijdr. Vischf. Sumatra, p. 43.
Halichoeres poecila Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 288. — Atl. Ichth. I, 1862, p. 115.
Halichoeres Reichei Bleeker, l.c. — ibid. p. 116.
Platyglossus nebulosus Günther, Cat. Brit. Mus. IV, 1862, p. 151.
Platyglossus poecilus Günther, ibid. p. 152.
Platyglossus poecilus Steindachner, Sitzber. Akad. Wien LIII, 1866, p. 463.
Platyglossus nebulosus Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 544.
Platyglossus poecilus Klunzinger, ibid. p. 545.
Choerojulis poecila von Martens, Preuss. Exp. Ost-Asien I, 1876, p. 397.
Platyglossus nebulosus Day, Fishes of India, Prt. 3, 1877, p. 400.
Halichoeres nebulosus Seale, Occas. Papers B. P. Bishop Mus. I, 1901, p. 88.
Halichoeres annulatus Fowler, Journ. Acad. Nat. Sc. Philadelphia (2) XII, 1904, p. 535.
Halichoeres poecilus Jordan & Seale, Proc. U. S. Nat. Mus. XXVIII, 1905, p. 785. — Bull. Bur. Fish. XXVI, (1906) 1907, p. 30.
Platyglossus nebulosus Günther, Fische der Südsee III, 1909, p. 265.
Platyglossus nebulosus M. Weber, Siboga Exp. Fische 1913, p. 371.
Halichoeres poecilus McCulloch, Austr. Zoologist II, Prt. III, 1922, p. 98.
Halichoeres nebulosus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 273.
Halichoeres reichei Fowler & Bean, ibid. p. 275.
Halichoeres nebulosus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 341. — ibid. XI, 1931, p. 355.

D. IX. 11. A. III. 11. P. 2. 11—12. V. I. 5. Ll. 27—29.

Ltr. $\frac{\frac{1\frac{1}{2}-2}{1}}{9-10}$.

Height 3.1—3.4, 3.7—4 in length with caudal. Head 3—3.1, 3.5—3.7 in length with caudal. Height of head 1.3 in its length. Eye 4—6, 1.4—2 in snout and 1—1.4 in almost flat interorbital space. Mouth nearly horizontal, more than half diameter of eye below level of lower border of eye. Maxillary reaching to below anterior nostril. Lips plated, the inner plate crenulated. Teeth pointed, the four anterior ones in the upper jaw canines, the inner pair longest, somewhat curved, directed forwards, the outer pair shorter, curved backwards. Two canines anteriorly in the lower jaw. A canine at corner of mouth. Head naked, excepting above, where the scales begin above or slightly behind hindmargin of eye. About 9 rows of scales before dorsal, these scales much smaller than those of the body. Similar small scales on thorax between isthmus and base of ventrals. Dorsal spines stiff and pungent, first about equal to eye, last spine equal to snout. Longest soft dorsal rays somewhat longer. Dorsal pointed behind. First anal spine minute, third longest, equal to snout or somewhat shorter. Soft anal similar to soft dorsal. Pectorals and ventrals subequal, as long as head without snout or somewhat shorter. Caudal truncate. Colour of preserved specimens reddish brown, lighter below, generally more so anteriorly. A dark cloudy band from head to caudal, often with branches upwards and downwards or separated into a series of large blotches, which may also assume the form of indistinct cross bars. Often some scales silvery, forming light spots here and there on back and sides. Sometimes arranged in such a way, that they form about 5 short silvery narrow cross bands on back, or a silvery longitudinal band below the dark band in anterior part of body. A silvery stripe at base of pectorals generally present, sometimes followed below by another silvery or bluish band. Several light bluish bands, with a narrow dark border on head. A band from snout to eye always present. Generally a narrower band above it, from nostril to eye. A band from hindborder of eye to end of operculum, connecting a dark bluish oblong blotch behind eye with a similar spot on opercular flap. A branch from this band runs downwards to suboperculum. These bands may be interrupted, forming irregular or semicircular elongate patches. A few similar small patches above these bands on upper part of head, behind eye, may be present. Also on interorbital space, where a horseshoe-shaped patch is often present. A band from corner of mouth, below eye, to opercle. This band either ends here, or is curved downwards and again forwards, forming a loop or even a ring, in which case the branch to corner of mouth disappears. This ring is then situated on the preopercle and the interopercle. Dorsal hyaline, with a subterminal milky white longitudinal band on the spinous part; below it oblique short bars, more or less bordered with a narrow brown line; on the soft dorsal these bars are more pronounced, the brown lining much broader and darker between the first to third rays, forming a dark ocellus. Posteriorly the bars are broken into round spots, forming one or two rows of light ocelli in the posterior part of the soft dorsal. A small dark ocellus between the first and second dorsal spines. Anal light violet with a basal row of white ocelli, one between each ray, and a median white longitudinal band narrowly bordered above and below with dark brown. Caudal uniform yellowish, or with five or six transverse rows of dark brown spots, forming cross bars. Pectorals yellowish brown. Ventrals yellowish brown, the first ray white. Length 115 mm.

Habitat: Singapore; Sumatra (Benkulen, Trussan, Priaman, Padang); Batu Islands; Java (Pagotang, Karanbollong Patjitan, Batu Ulo!); Bawean; Borneo; Bali!; Celebes (Makassar, Menado, Tanawanko); Siau!; Sangi Islands; Talaut Islands!; Kabaëna!; Binongka!; Flores; Rotti!; Timor; Buru; Ceram; Halmahera; Ternate; Ambon; Nusa Laut!; Goram; Tiur!; Aru Islands; New Guinea (Papua). — Red Sea, Coast of British India, Riu Kiu Islands, Philippines, Queensland, New South Wales, Ponapé, New Hebrides, Guam, Samoa, Tahiti. In sea on reefs.

Note. Bleeker characterized *poecila* by P. 2.11 and a band in the form of a loop or a ring on the cheek, *reichei* by P. 2.12 and a violet patch at base of pectorals. The differences in colour are of no value, as the bands on the head are very variable in this species and show all kinds of transitions between an almost straight bar, a loop, or a ring on the cheek. I find that the number of pectoral rays, which may be 11 or 12, is not correlated with the colour markings as Bleeker thought. The dark spot at base of pectoral, on which Fowler & Bean lay stress, is very feeble or absent in some specimens, more pronounced in others, but does not seem to be of specific value.

24. **Halichoeres hyrtli** (Blkr.)

Julis mola Cantor, Journ. Asiat. Soc. Bengal XVIII, 1850, p. 1220 (pro parte).
Julis (*Halichoeres*) *Hyrtlii* Bleeker, Acta Soc. Sc. Indo-Neerl. I, 1856. Beschr. n. visch. Menado, p. 60.
Halichoeres Hyrtli Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 286. — Atl. Ichth. I, 1862, p. 121.

Platyglossus hyrtelii Günther, Cat. Brit. Mus. IV, 1862, p. 149.
Platyglossus bifasciatus Steindachner, Verh. zool. bot. Ges. Wien XVI, 1866, p. 477.
Platyglossus hyrtlii Day, Fishes of India, Prt. 3, 1877, p. 398.
Platyglossus bilineatus Karoli, Termeszetrajzi Füzetek V, 1882,. p. 174[1]).
Halichoeres hyrtli Jordan & Seale, Bull. Bur. Fish. XXVI, (1906) 1907, p. 29.
Halichoeres hyrtlii Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 285.
Halichoeres hyrtlii Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 343.

D. IX. 11—12. A. III. 12 (13). P. 2. 12. V. I. 5. Ll. 28—29. Ltr. $\begin{array}{c} 2-2\frac{1}{2} \\ \hline 1 \\ \hline 9-10 \end{array}$.

Height 3.4—3.7, 4—4.4 in length with caudal. Head 2.8—3.1, 3.3—3.7 in length with caudal. Height of head 1.3—1.6 in its length. Eye 5.5—6, 1.9—2 in snout and equal to or slightly less than nearly flat interorbital space. Mouth moderate, somewhat oblique. Corner of mouth half eye diameter below level of lower border of eye. Lips thick, plated, the inner plate crenulated. Teeth pointed, increasing in size anteriorly, the foremost pair in the upper and in the lower jaw canines. Head naked, excepting above, where the scales begin behind eye. About 12 rows of scales before dorsal, these scales much smaller than those of sides of body. Similar small scales between isthmus and ventrals. Dorsal spines stiff and pungent, first as long as eye, second and third about half diameter of eye longer, last spine twice as long as eye. Soft dorsal not higher than spinous part, rounded behind. First anal spine minute, third longest, equal to eye. Soft anal slightly less deep than soft dorsal, truncate behind. Pectorals equal to postorbital part of head. Ventrals without produced rays, as long as snout and eye together. Caudal rounded. Colour of preserved specimens creamy, lighter below. Scales of body generally with a light reddish brown spot. A median dark brown or violet band on snout, bifurcating before interorbital space, running along base of dorsal and united again on back of caudal peduncle. A similar band from upper lip to eye, continued behind eye over operculum and opercular flap along sides to middle of caudal base, where it ends in a black, light edged ocellus. Immediately behind eye this band is crossed by a vertical narrow greenish grey stripe and a dark blue broader vertical stripe. Generally a branch from the longitudinal band runs from here to upper part of opercle. A triangular dark brown spot supe-

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1) Karoli records "*Platyglossus bilineatus* Steind.". This is certainly an error, and most probably "*bifasciatus*" is meant.

riorly at base of pectoral. Dorsal whitish with two or three wavy longitudinal dark greyish bands, the lower one deep black between first and second or first and third spines, bordered above by white and forming an elongate ocellus. In the posterior part of the spinous dorsal and on the soft dorsal the greyish bands form reticulations or series of rings. Anal creamy, uniform. Caudal greyish, with faint vertical rows of small white round spots. Pectorals and ventrals creamy. Length 108 mm.

Habitat: Singapore; Nias; Banka; Java (Karangbollong, Patjitan); Borneo (Sandakan); Celebes (Makassar, Menado); Sangi Islands; Waigeu!. — Persian Gulf, Ceylon, Andamans, Christmas Island, Pinang, Hongkong, Philippines. In sea.

25. **Halichoeres prosopeion** (Blkr.)

Julis (*Halichoeres*) *prosopeion* Bleeker, Nat. Tijdschr. Ned. Indië V, 1853, p. 347.
Halichoeres prosopeion Bleeker, Atl. Ichth. I, 1862, p. 122.
Platyglossus prosopeion Günther, Cat. Brit. Mus. IV, 1862, p. 155.
Platyglossus (*Paraplatyglossus*) *prosopeion* Bleeker, Arch. Neerl. Sc. Nat. XIII, 1878, p. 40.
Halichoeres prosopeion Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 290.
Halichoeres prosopeion Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 343.
Halichoeres prosopeion P. J. Schmidt, Trans. Pac. Comm. Acad. Sc. USSR. I, 1930, p. 83.

D. IX. 12. A. III. 12. P. 2. 12. V. I. 5. Ll. 28. Ltr. $\dfrac{2}{\dfrac{1}{10}}$.

Height 3.2—3.4, 3.8—4.1 in length with caudal. Head 3.4—3.5, 4.1 in length with caudal. Height of head 1.2—1.4 in its length. Eye 4.9—5.3, 1.4—1.8 in snout and somewhat less than slightly convex interorbital space. Head naked. Mouth moderate, somewhat oblique. Two strong canines anteriorly in both jaws, the next pair in the upper jaw caninoid, curved backwards. Posterior canine very large. Fins without scaly sheath. First dorsal spine equal to snout, last spine almost as long as snout and eye together. Soft dorsal somewhat higher than spinous part. Third anal spine longer than snout. Soft dorsal similar to soft anal. Pectorals as long as head without snout. Ventrals, with the first ray produced longer than pectorals. Caudal slightly rounded. Colour of preserved specimens uniform brown. A dark blotch between second and third dorsal spines. (Description made after the typical specimens of Bleeker's collection in the Leiden Museum). Length 135 mm.

Habitat: Ambon!; New Guinea (Manokwari). — Riu Kiu Islands, Philippines. In sea.

26. **Halichoeres amboinensis** (Blkr.)

Julis (Halichoeres) amboinensis Bleeker, Acta Soc. Sc. Indo-Neerl. I, 1856. Beschr. visch. Amboina, p. 55.
Halichoeres amboinensis Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 285. — Atl. Ichth. I, 1862, p. 122.
Platyglossus amboinensis Günther, Cat. Brit. Mus. IV, 1862, p. 156.
Halichoeres amboinensis Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 288.

D. IX. 12 (13). A. III. 12 (13). P. 2. 12—13. V. I. 5. Ll. 28—29. Ltr. $\frac{3}{\frac{1}{9-10}}$.

Height 3.1, 3.7 in length with caudal. Head 3.4, 4 in length with caudal. Height of head 1.25 in its length. Eye 5, 2.1 in snout and about equal to interorbital space. Two canines anteriorly in each jaw. Dorsal spines slightly increasing in length posteriorly. Soft dorsal not much higher than spinous part, pointed behind. Soft anal similar to soft dorsal. Pectorals rounded, equal to snout and eye. Ventrals pointed. Caudal rounded. Colour of preserved specimen brownish. Head with several light blue bands, bordered by darker. Two over interorbital space connecting upper borders of eyes, one from snout to eye and continued behind eye to end of opercle. Another from corner of mouth, below eye to pectoral base, which has a large dark triangular patch. Two less distinct ones from behind eye to upper part of opercle, continued here as indistinct spots on body. A median dark elongate spot on dorsal membrane from first to fourth spines. Rest of dorsal, anal, and caudal uniform, but with oblique lines when fresh. Length of type, examined in the British Museum and the largest specimen known, 140 mm.

Habitat: Ambon!; Solor!; Doworra Island. — Philippines. In sea.

27. **Halichoeres pardaleocephalus** (Blkr.)

Julis (Halichoeres) pardaleocephalus Bleeker, Verh. Bat. Gen. XXII, 1849. Bijdr. ichth. Bali, p. 8.
Halichoeres pardaleocephalus Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 287. — Atl. Ichth. I, 1862, p. 123.
Platyglossus pardaleocephalus Günther, Cat. Brit. Mus. IV, 1862, p. 158.

D. IX. 11 (12). A. III. 11. P. 2. 12. V. I. 5. Ll. 28. Ltr. $\dfrac{2\frac{1}{2}-3}{\dfrac{1}{9}}$.

Height 3.2, 3.9 in length with caudal. Head 3.1, 3.7 in length with caudal. Height of head 1.3 in its length. Eye 5, 1.6 in snout and 1.1 in flat interorbital space. Mouth moderate, slightly oblique. Corner of mouth nearly one eye diameter below level of lower border of eye. Maxillary reaching to below anterior nostril. Teeth pointed, the anterior pair in both jaws canines, those of the upper jaw longer than those of the lower jaw. A canine at corner of mouth. Head naked, excepting above, where the scales begin above hind-border of eye. About 13 rows of scales before dorsal, these scales smaller than those of the body. Scales on thorax smaller than those of sides of body, but larger than those before dorsal. Dorsal spines stiff and pungent. First spine as long as eye. Spines increasing in length posteriorly, the last spine equal to snout. Soft dorsal higher than spinous part, the longest ray half diameter of eye longer than snout. Dorsal slightly rounded behind. First anal spine minute, third longest, longer than eye but shorter than snout. Soft anal similar to soft dorsal. Pectorals about as long as head without snout. Ventrals with the first ray slightly produced, somewhat shorter. Caudal rounded. Colour of preserved specimens pinkish, lower part of head lighter. Scales of sides with a semilunar dark patch, giving to the body a more or less reticulated appearance. On the back above the lateral line the scales have more rounded spots, which may unite into short wavy lines before dorsal. Similar dark spots and short bars on upper part of head. A broad dark vertical bar behind eye. Sides of head with more or less curved dark bands, which may be broken into rows of spots. Dorsal, anal, and caudal light pinkish, with indistinct white markings or rows of large spots. A small brown spot between first and second dorsal spines. Pectorals and ventrals hyaline or whitish. Membrane between first and second ventral ray dusky. A triangular brown spot superiorly at base of pectoral may be present. Length 130 mm.

Habitat: Sumatra (Padang); Nias!; Java (Patjitan, Batu Ulo!); Bali. In sea.

28. **Halichoeres kneri** Blkr.

Halichoeres Kneri Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 307. — Atl. Ichth. I, 1862, p. 119.

Platyglossus kneri Günther, Cat. Brit. Mus. IV, 1862, p. 150.

Platyglossus Ransonneti Steindachner, Sitzber. Akad. Wien LX, 1870, p. 567.

Platyglossus kneri Giltay, Mem. Mus. Royal Hist. Nat. Belgique V, Fasc. 3, 1933, p. 77.

D. IX. 12 (13). A. III. 12. P. 2. 13. V. I. 5. Ll. 28. Ltr. $\begin{array}{c}2\text{—}2\frac{1}{2}\\ \hline 1\\ \hline 9\text{—}10\end{array}$.

Height 3.1, 3.6 in length with caudal. Head 3.1, 3.6 in length with caudal. Height of head 1.5 in its length. Eye 5, 1.5 in snout and equal to almost flat interorbital space. Mouth nearly horizontal, half diameter of eye below level of lower border of eye. Maxillary not quite reaching to below anterior nostril. Teeth pointed, the anterior pair in the upper and lower jaws moderate canines. A canine at corner of mouth. Head naked, excepting above, where the scales begin above hindborder of eye. About 14—15 rows of scales before dorsal. These scales very small, much smaller than those of rest of body. Similar small scales between isthmus and base of ventrals. Dorsal spines stiff and pungent. First spine slightly less than eye, second and third about equal to eye, last spine one eye diameter and a half. Soft dorsal slightly higher than spinous part, somewhat pointed behind. First anal spine minute, third longest, more than diameter of eye. Pectorals as long as head without snout. Ventrals without produced rays equal to snout and eye together. Caudal rounded. Colour of preserved specimens light reddish brown above, creamy below. A brown band from nape along base of dorsal to base of upper caudal rays, formed by dark spots on scales immediately below dorsal. The next row shows a row of fainter spots. A second broader band, from behind eye, where it begins with a darker vertical streak, through opercular flap to base of median caudal rays. A faint light creamy band below and another above the anterior part of this band. A faint brown band from snout to eye and a median one from snout to occiput, more or less confluent with the bands along the back. Dorsal creamy, finely dotted with brown. A brown patch between the 4th and 5th dorsal rays. A small brown spot superiorly at base of caudal, which is uniform hyaline. Ventrals and pectorals hyaline. A small brown spot superiorly at base of pectorals. Length 68 mm.

Habitat: Singapore; Sumatra (Lampasing); Nias!; Banka; Java (Karangbollong); Celebes (Menado). In sea.

29. **Halichoeres timorensis** (Blkr.)

Julis (Halichoeres) timorensis Bleeker, Nat. Tijdschr. Ned. Indië III, 1852, p. 171.

Halichoeres timorensis Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 289. — Atl. Ichth. I, 1862, p. 120.

Halichoeres timorensis Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 343 (sine synon.).

D. IX. 11 (12). A. III. 11 (12). P. 2. 11—12. V. I. 5. Ll. 28. Ltr. $\begin{array}{c}2\\\hline 1\\\hline 9\end{array}$.

Height 3.3, 3.9—4.1 in length with caudal. Head 3—3.1, 3.5—3.8 in length with caudal. Height of head 1.3—1.5 in its length. Eye 4.2—5, 1.3—1.7 in snout and equal to nearly flat interorbital space. Mouth horizontal, somewhat less than half diameter of eye below level of lower border of eye. Maxillary scarcely reaching to below anterior nostril. Lips thick, plated. Teeth conical, the anterior pair in both jaws longest, canines, but not much longer than the following pair, specially those of the lower jaw. Head naked, excepting above, where the scales begin above hindborder of eye. About 10 rows of scales before dorsal, these scales much smaller than those of sides of body. Similar small scales between isthmus and base of ventrals. Dorsal spines stiff and pungent, first almost equal to eye. Spines increasing in length posteriorly, the last spine more than one eye diameter and a half. Soft dorsal not higher than spinous part, First anal spine minute, third longest, somewhat longer than eye. Soft anal similar to soft dorsal. Ventrals without produced rays, equal to postorbital part of head. Pectorals half or one eye diameter longer. Caudal rounded. Colour of very faded specimens pale creamy, white below. A chalky white median stripe on snout, ending on interorbital space. A similar stripe on both sides of it, ending above eye. Sinuated white lines between these stripes. A silvery band below eye, through preopercle to opercle. A faint silvery somewhat wavy band on anterior part of lower sides. These markings may be absent. Fins hyaline. The dorsal may show traces of narrow lines, forming loops. A brown spot between 2nd and 3rd dorsal rays. A dark spot at base of caudal, above lateral line, sometimes a second spot before it. Length 70 mm. (Type in British Museum examined.)

Habitat: Timor!; Kei Islands!. — Viti Islands. In sea.

Note. Fowler l.c. cites among the synonyms of *timorensis: Platyglossus trilineatus* Peters, Monatsber. Akad. Berlin 1876, p. 843 (New Hanover); but on the page cited Peters only mentions *Platyglossus trilineatus* Bl. Schn., without further explanation or description. *Labrus trilineatus* Bl. Schn. however is a species of *Stethojulis.* Bleeker describes a dark point between the first and second spines of the dorsal, but I have been unable to see it in the typical specimen.

30. **Halichoeres kawarin** (Blkr.)

Julis (*Halichoeres*) *kawarin* Bleeker, Nat. Tijdschr. Ned. Indië III, 1852, p. 172.
Halichoeres kawarin Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 286. — Atl. Ichth. I, 1862, p. 121.
Platyglossus kawarin Günther, Cat. Brit. Mus. IV, 1862, p. 152.
Platyglossus kawarin Day, Fishes of India, Prt. 3, 1877, p. 400.
Platyglossus kawarin Günther, Fische der Südsee III, 1909, p. 266.
Halichoeres kawarin Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 343.

D. IX. 11. A. III. 10 (11). P. 2. 11. V. I. 5. Ll. 28. Ltr. $\begin{array}{c} 2-2\frac{1}{2} \\ \hline 1 \\ \hline 7 \end{array}$.

Height 3.4, 3.9 in length with caudal. Head 3.1, 3.6 in length with caudal. Height of head 1.3 in its length. Eye 5.1, twice in snout and slightly more than almost flat interorbital space. Mouth moderate, slightly oblique. Corner of mouth almost one eye diameter below level of lower border of eye. Maxillary reaching to below anterior nostril. Teeth pointed, the anterior pair in both jaws strong curved canines. A small canine at corner of mouth. Head naked, excepting above, where the scales begin above hind-border of eye. About 9 rows of scales before dorsal, these scales much smaller than those of sides of body. Similar small scales immediately behind isthmus. Dorsal spines stiff and pungent. First spine slightly less than eye. Spines increasing in length posteriorly, the last spine about as long as snout. Soft dorsal slightly higher than posterior part of spinous dorsal, not much pointed behind. First anal spine minute, third longest, longer than eye but shorter than snout. Soft anal similar to soft dorsal. Pectorals and ventrals, the latter with the first ray produced, subequal and almost as long as head without snout. Caudal rounded. Colour of preserved specimens ivory colour. A very large violet or brownish patch from head to anterior part of soft dorsal, extending upwards to just above lateral line and downwards to belly above anal, but leaving thorax and sides below pectorals free. Two much smaller blotches behind it on lateral line, one between end of dorsal and anal and the other on caudal peduncle. Judging from the figures given by Bleeker and Günther these blotches may be much less developed or cover a still greater part of the body. Most scales in region covered by blotches have dark centre. A dark streak on interorbital space, followed behind by a horseshoe-shaped marking. A darkish streak from upper lip to eye. A similar stripe beginning with a very dark blotch behind eye to supratemporal region. A curved darkish band on cheek and a similar one on opercle. All these bands more or less distinctly bordered by a narrow dark line. A large dark bluish blotch on opercular flap. Dorsal whitish, spinous part uniform, soft part with a greyish edge and with two longitudinal rows of greyish rings. These rings may fuse with their neighbour of the same row or of the row below, in which case more or less horizontal or oblique short bars come into existence. A large deep black blotch between the first to fourth dorsal rays. Anal dusky with a median white longitudinal band. Caudal uniform, in life with dark rings or ocelli. Pectorals and ventrals hyaline. Length 112 mm.

Habitat: Duizend Islands!; Celebes (Bonthain); Timor; Waigeu! — Andamans, Philippines!, Samoa, Society and Kingsmill Islands. In sea.

31. **Halichoeres dayi** (Steind.)

Platyglossus Dayi Steindachner, Sitzber. Akad. Wiss. Wien LX, 1870, p. 567.
Platyglossus Dayi Karoli, Termeszetrajzi Füzetek V, 1882, p. 174.

D. IX. 12. A. III. 12. Ll. 29.

Height $4^2/_3$ in total length. Head (without opercular flap) nearly 4 in total length. Eye equal to snout. A canine at corner of mouth. In colour resembling *H. javanicus* viz. by having broad cross bands formed by dark edgings to some of the rows of scales. A dark blue cross bar behind eye; a second one before the upper pectoral rays. A dark blotch on the lower portion of the finmembrane between the third to fifth dorsal rays. A narrow dark stripe on the anterior side of the first dorsal spine. A blue band obliquely over the cheeks, beginning on hindborder of preopercle and running obliquely downwards to corner of mouth. A semilunar broad band on the upper border and the superior part of the hindborder of the opercle. (After Steindachner, not seen by me.)

Habitat: Singapore.

32. **Halichoeres hartzfeldi** (Blkr.)

Julis (Halichoeres) Hartzfeldii Bleeker, Nat. Tijdschr. Ned. Indië III, 1852, p. 563.
Halichoeres Hartzfeldi Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 286. — Atl. Ichth. I, 1862, p. 123.
Platyglossus hartzfeldii Günther, Cat. Brit. Mus. IV, 1862, p. 157.
Choerojulis Hartzfeldi von Martens, Preuss. Exp. Ost-Asien I, 1876, p. 397.
Halichoeres hartzfeldii Fowler & Bean, Bull. U. S. Nat. Mus. 100, Vol. VII, 1928, p. 291.

D. IX. 11. A. III. 11. P. 2. 11. V. I. 5. Ll. 29. Ltr. $\begin{array}{c} 2\frac{1}{2} \\ \hline 1 \\ \hline 12 \end{array}$.

Height 3.6—3.8, 4.2—4.4 in length with caudal. Head 3—3.3, 3.5—3.8 in length with caudal. Height of head 1.3—1.4 in its length. Eye 5—6.4, 2—2.1 in snout and 1.3—1.6 in convex interorbital space. Mouth moderate, slightly oblique. Corner of mouth one eye diameter below level of lower border of eye. Maxillary reaching to below anterior nostril. Lips thick, plated, the inner plate crenulated. Teeth conical or pointed, the anterior pair in both jaws long pointed curved canines. A canine at corner of mouth. Head naked, excepting above where the scales begin above hindborder of eye. About 14 rows of scales before dorsal, these scales much smaller than those of the body. Similar small scales between isthmus and base of ventrals. Scales of belly conspicuously smaller than those of sides. Dorsal spines stiff and pungent. First spine as long as eye. Spines increasing in length posteriorly, the ninth spine somewhat shorter than snout. Soft dorsal slightly higher than spinous part, the longest rays as long as snout. Dorsal pointed behind. First anal spine about half diameter of eye, third longest, longer than eye but shorter than snout. Soft anal similar to soft dorsal. Pectorals rather pointed, as long as head without snout. Ventrals with the first ray somewhat produced as long as snout and eye together. Caudal rounded. Colour of preserved specimens light brown above, creamy below. Some of the scales on anterior part of back with white more or less shining spots. Scales of anterior third of lateral line with similar but much larger spots. A broad light yellowish band about two scales deep from operculum to base of median caudal rays, bordered above by a narrow grey wavy line. Sometimes a few dark scales on the posterior part of this line. Ventrally the band shows some irregular extensions downwards in the middle of its course. Head with the following shining white bands and patches which generally are bordered with a narrow greyish line: one band from eye to corner of mouth continued here downwards on chin and meeting that of the other side on ventral median line. Behind this band a second one on chin, ending above on cheeks. A band from hindborder of eye to end of operculum, curved downwards here along hindmargin of opercle and subopercle and again bent forwards near its posterior margin. A band or patch from eye to supratemporal region prolonged as a row of spots on lateral line as described above. A patch beginning on posterior edge of preopercle and continued obliquely downwards on interopercle. Base of pectoral encircled by a band which is more or less connected with the posterior loop of the band on the opercle. Dorsal bluish above, pinkish below, the two colours separated by a wavy light band, followed by a narrow bluish line. A subterminal narrow whitish longitudinal band. A light violet ocellus bordered by darker at the base of the membranes between the third and each following spine and between all the dorsal rays. Anal bluish distally, white at base, the two colours separated by a double wavy light and dark line. Caudal bluish with vertical wavy dark lines or rows of dark edged ocelli in its basal part. Pectorals and ventrals light pinkish. Length over 200 mm. (A specimen of Bleeker's collection in the Amsterdam Museum examined.)

Habitat: Sumatra (Padang); Java (Anjer); Bali; Celebes (Menado); Buru; Ternate; Ambon; Flores. — Philippines. In sea.

33. **Halichoeres argus** (Bl. Schn.) (Fig. 34. A and B, p. 231)

Labrus guttatus Bloch, Naturgesch. Ausländ. Fische V, 1791, p. 149 (non Bonaterre?).
Labrus argus Bloch Schneider, Syst. Ichth. 1801, p. 263.
Julis argus Bennett, Zool. Journ. III, 1828, p. 577.
Julis argus Bleeker, Verh. Bat. Gen. XXII, (1847) 1849. Gladsch. Labr. p. 7.
Julis (*Halichoeres*) *polyophthalmus* Bleeker, Nat. Tijdschr. Ned. Indië III, 1852, p. 731.
Julis (*Halichoeres*) *argus* Bleeker, Acta Soc. Sc. Indo-Neerl. VIII, 1860. Achtste bijdr. vischf. Sumatra, p. 37.
Halichoeres guttatus Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 286. — Atl. Ichth. I, 1862, p. 124.
Platyglossus guttatus Günther, Cat. Brit. Mus. IV, 1862, p. 155.
Halichoeres argus Jordan & Seale, Bull. Bur. Fish. XXVI, (1906) 1907, p. 30.
Platyglossus guttatus Günther, Fische der Südsee III, 1909, p. 270.
Platyglossus guttatus M. Weber, Siboga Exp. Fische 1913, p. 373.
Halichoeres argus Fowler & Bean, Bull. U. S. Nat. Mus. 100, Vol. VII, 1928, p. 292.
Halichoeres argus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 343.
Halichoeres fijiensis Herre, Field Mus. Nat. Hist. Zool. Ser. XVIII, 1935, p. 410.

D. IX. 11 (12)—12 (13). A. III. 11—12. P. 2. 12. V. I. 5. Ll. 28. Ltr. $\begin{array}{c} 2-2\frac{1}{2} \\ \hline 1 \\ \hline 8-9 \end{array}$.

Height 2.8—3.4, 3.3—3.9 in length with caudal. Head 2.8—3.2, 3.3—3.7 in length with caudal. Height of head 1.3 in its length. Eye 4.7—5.6, 1.7—2 in snout and 1—1.3 in slightly convex interorbital space. Mouth moderate, slightly oblique. Corner of mouth more than one half diameter of eye below level of lower border of eye. Maxillary not reaching to below anterior nostril. Teeth conical or somewhat pointed, the anterior pair in both jaws moderate canines. Head naked, excepting above, where the scales begin above or slightly behind hindborder of eye. Ten to twelve rows of scales before dorsal, these scales much smaller than those of the body. Similar small scales between isthmus and base of ventrals. Dorsal spines stiff and pungent; the first as long as eye, the last as long as snout. Soft dorsal slightly higher than spinous part, truncate behind. First anal spine minute, third longest, somewhat more than eye. Soft anal similar to soft dorsal. Pectorals about equal to head without snout. Ventrals sometimes with the first ray produced and in that case as long as pectorals; if not,

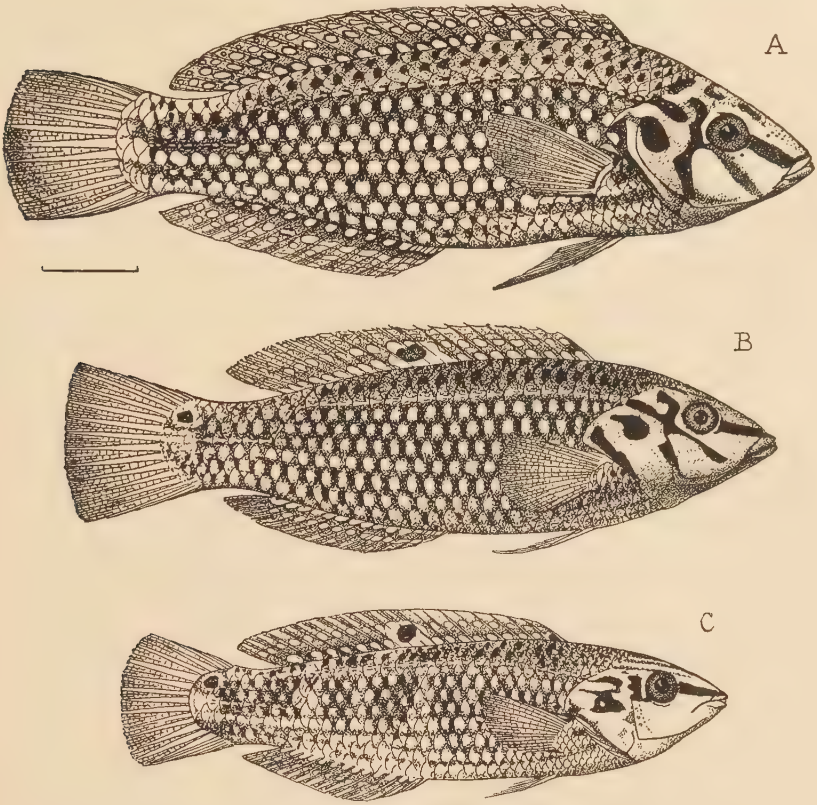

Fig. 34. A. *Halichoeres argus* (Bl. Schn.) B. Intermediate form (*Halichoeres fijiensis* Herre) C. *Halichoeres leparensis* (Blkr.). × $1^1/_5$

equal to snout and eye together. Caudal rounded. Colour of preserved specimens light pinkish. The scales of the two superior rows on body below dorsal with a large dark blue or brown centre, sometimes interrupted at regular distances by a scale without spot and separating the dark coloured scales in 4 or 5 groups. The next row of scales, anteriorly perforated by the lateral line, is colourless. All the scales of lower side and belly with a dark upper, lower, and hinder margin, leaving only the central portion pinkish (red in life). This gives a reticulated appearance to the body the colour of which could also be described as dark with rows of round pinkish spots. A dark stripe along sides of snout from upper lip to anterior margin of eye. A narrow black stripe on median line of snout, bifurcating before interorbital space and dissolved into blotches behind eye. A dark vertical bar behind eye. From the lower extremity of this bar one narrow band runs obliquely forwards on cheek, and another along suture between opercle and preopercle downwards. The longitudinal dark band, formed by the dark upper margins of the scales immediately below lateral line is continued for some distance on the opercle and sometimes reaches the vertical bar behind eye. The dark lower borders of the scales of the same row form also a band continued on opercle, where it ends in a large dark blotch. Dorsal with a subterminal dark line followed by 3 rows of dark edged ocelli, the interspaces between these rows getting darker towards the base of the fin. Anal similar but the ocelli of the middle row may fuse into a light longitudinal band. Caudal yellowish, sometimes dusky or blackish towards its tip, covered by faint, dark edged, light ocelli. Pectorals and ventrals hyaline, the ventrals dusky between the first and second rays in the cases where the first ray is produced. Length 110 mm.

Habitat: Singapore; Sumatra (Kauer, Trussan, Padang!, Tiku, Priaman, Siboga); Nias!; Batu Islands; Lepar; Biliton; Java (Karangbollong, Prigi); Madura!; Bali; Celebes (Menado, Tanawanko); Sangi Islands; Siau!; Buru; Ceram; Ambon; New Guinea (Papua). — China, Indochina, Annam, Philippines, New Hebrides, North Australia, Fiji. In sea.

Note. Weber l.c. has already pointed out that there exist specimens which are intermediate between this species and *leparensis*. It may be possible that they are hybrids. They have been described as *H. fijiensis* by Herre l.c.

34. **Halichoeres chloropterus** (Bl.)

Labrus chloropterus Bloch, Naturgesch. Ausländ. Fische V, 1791, p. 151.

Julis semidecorata Lesson, Mem. Soc. Hist. Nat. Paris IV, 1828, p. 403. — Voyage Coquille, Zool. II, 1830, p. 138.

Julis (*Halichoeres*) *Cuvieri* Bleeker, Nat. & Geneesk. Arch. Ned. Indië IV (2), 1847, p. 160. — Verh. Bat. Gen. XXII, 1849. Gladsch. Labr. p. 24 (non Bennett).

Halichoeres bleekeri Günther, Ann. Mag. Nat. Hist. (3) VIII, 1861, p. 386.

Halichoeres chloropterus Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 285. — Atl. Ichth. I, 1862, p. 125.

Platyglossus chloropterus Günther, Cat. Brit. Mus. IV, 1862, p. 144.

Platyglossus chloropterus Steindachner, Sitzber. Akad. Wiss. Wien LX, 1870, p. 566.

Platyglossus (*Halichoeres*) *chloropterus* Bleeker, Verh. Akad. Amsterdam XVIII, (1877) 1878, Poissons Maurice, p. 10.

Halichoeres chloropterus Fowler & Bean, Bull. U. S. Nat. Mus. 100, Vol. VII, 1928, p. 294.

D. IX. 11 (12). A. III. 10—11 (12). P. 2. 12. V. I. 5. Ll. 28—30. Ltr. $\begin{array}{c} 2\frac{1}{2} \\ \hline 1 \\ \hline 9-10 \end{array}$.

Height 2.9—3.1, 3.6—3.7 in length with caudal. Head 2.9—3.3, 3.7—3.9 in length with caudal. Height of head 1.2—1.3 in its length. Eye 5.3—6.1, 2—2.1 in snout and 1.2—1.3 in somewhat convex interorbital space. Mouth moderate, slightly oblique. Corner of mouth more than half diameter of eye below level of lower border of eye. Maxillary reaching to below anterior nostril. Teeth pointed, the anterior pair in both jaws long slender canines. A canine at corner of mouth. Head naked, excepting above, where the scales begin behind hindborder of eye. About 12 rows of scales before dorsal, these scales much smaller than those of the body. Similar small scales on thorax between isthmus and base of pectorals and ventrals. Dorsal spines stiff and pungent. First spine equal to or somewhat more than eye, last spine nearly as long as snout. Soft dorsal slightly higher than spinous part, the longest ray as long as snout. Dorsal moderately pointed behind. First anal spine minute, third longest, equal to one eye diameter and a half. Soft anal similar to soft dorsal. Pectorals equal to head without snout. Ventrals with the first ray produced, equal to snout and eye together or a little longer. Caudal rounded. Colour of preserved specimens very light pinkish or buff, each scale of body with a somewhat darker centre. Often a deep violet or brownish diffuse area covering back from anterior dorsal spines to median dorsal rays, slightly tapering ventrally and getting indistinct towards belly. Head ivory white, with very broad blue or violet bands and a dark blue vertical bar behind eye. One band from upper lip to frontborder of eye, continued as a very narrow one below eye to the vertical bar. Another band from behind corner of mouth over preopercle, opercle, and ending on hindmargin of subopercle at level of base of pectoral. This band connected by a vertical one below eye with the first band. A third band may be present, also beginning behind corner of mouth and connected with the second one by an irregular band or patch running over interopercle and ending inferiorly on hindborder of subopercle. Two parallel bands run backwards from vertical bar behind eye with a vertical connecting band on opercle to opercular flap and supratemporal region, here connected again, so that the posterior part of the opercle and the supratemporal region are almost entirely violet, leaving only a pair of ivory white blotches between them. These bands are more or less continued as blue bands on the body, one band on scales of lateral line and one on the row below. The next row ventrally has a similar band. These bands fuse into the dark area of the sides and leave longitudinal rows of pinkish spots between them, each scale with one spot as the hindborder of the scales is of the same blue colour as the bands. Dorsal yellowish with a median violet longitudinal band. In the posterior portion of the spinous dorsal and on the soft dorsal this band has a branch directed obliquely downwards to the base of each spine and ray. Anal very light violet with a median longitudinal white bar, bordered above and below by a very narrow darker violet line. Caudal yellowish. Ventrals and pectorals hyaline with a yellowish hue. A rather broad deep blue band along base of pectorals. Length 190 mm.

Nomen indig. Kodja (Malay Batavia).

Habitat: Singapore; Banka; Java (Batavia); Duizend Islands; Bawean; Celebes (Makassar!, Menado); Ambon; Waigeu!; New Guinea (Papua). — Mauritius, Philippines, China, Pelew Islands. In sea.

35. **Halichoeres gymnocephalus** (Bl. Schn.)

Labrus gymnocephalus Bloch Schneider, Syst. Ichth. 1801, p. 251.
Julis (*Halichoeres*) *modestus* Bleeker, Nat. Geneesk. Arch. Ned. Indië IV, (2) 1847, p. 160. — Verh. Bat. Gen. XXII, 1849. Gladsch. Labr. p. 26.
Halichoeres modestus Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 287. — Atl. Ichth. I, 1862, p. 126.
Platyglossus modestus Günther, Cat. Brit. Mus. IV, 1862, p. 157.
Platyglossus gymnocephalus Peters, Monatsber. Akad. Berlin 1866, p. 270.

Platyglossus modestus Steindachner, Sitzber. Akad. Wiss. Wien LX, 1870, p. 567.
?*Platyglossus guttulatus* Macleay, Proc. Linn. Soc. New S. Wales VII, 1882, p. 587.
Halichoeres gymnocephalus Jordan & Richardson, Bull. Bur. Fish. XXVII (1907), 1908, p. 266.
Platyglossus gymnocephalus Günther, Fische der Südsee III, 1909, p. 271.
Halichoeres javanicus Fowler & Bean, Proc. U. S. Nat. Mus. LXXI. Art. 10. 1927, p. 10 (nec Blkr.).
Halichoeres gymnocephalus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 296.
Halichoeres gymnocephalus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 344.
Platyglossus gymnocephalus Giltay, Mem. Mus. Royal Hist. Nat. Belgique V, Fasc. 3, 1933, p. 77.
Halichoeres gymnocephalus Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 314.

D. IX. 11. A. III. 11. P. 2. 12. V. I. 5. Ll. 28. Ltr. $\frac{2\frac{1}{2}}{\frac{1}{9}}$.

Height 3.4—3.6, 4—4.3 in length with caudal. Head 3—3.2, 3.6—3.8 in length with caudal. Height of head 1.3—1.4 in its length. Eye 4.7—5.8, 1.6—2 in snout and 1—1.3 in somewhat convex interorbital space. Mouth moderate. Corner of mouth in adults more than one eye diameter below level of lower border of eye. Maxillary reaching to below anterior nostril. Teeth pointed, the anterior pair in both jaws strong slender canines. A canine at corner of mouth. Head naked, excepting above, where the scales begin behind hindborder of eye. About 12—13 rows of scales before dorsal, these scales much smaller than those of the body. Similar small scales on thorax between isthmus and base of ventrals and pectorals. Dorsal spines stiff and pungent. First spine slightly more than eye, last spine as long as snout. Soft dorsal scarcely higher than spinous part, slightly pointed behind. First anal spine slightly more than eye, third longest, nearly as long as snout. Soft anal similar to soft dorsal. Pectorals and ventrals, the latter with the first ray produced, subequal and as long as head without snout or somewhat shorter in young ones. Caudal slightly rounded. Colour of preserved specimens light reddish brown above, lighter below. Often a large elongate diffuse dark brown blotch on sides below lateral line, extending from below anterior part of dorsal to above anterior part of anal. Steindachner l.c. considers the specimens without this blotch to be females. All scales above and behind this blotch with a small dark spot, with exception of the row of scales above anal. Head with a short vertical dark bar behind eye. A light band from upper lip to front of eye, continued along its lower border to the dark vertical bar behind eye. An indication of a light band below eye, running horizontally through cheek to opercle, where it widens into a light blotch. Fins hyaline. A dark brown stripe along base of pectorals. Length 165 mm. (A specimen of *H. modestus* of Bleeker's collection in the Amsterdam Museum examined.)

Habitat: Singapore; Sumatra (Benkulen); Banka; Lepar; Biliton; Java (Batavia!); Duizend Islands; Bawean; Sumbawa; Timor; Ambon; Misol; Kei Islands!; Schouten Islands; New Guinea (Papua). — Philippines, Pelew Islands, Solomon Islands, New Hebrides, Engineer Group. In sea.

36. **Halichoeres javanicus** (Blkr.)

Julis (Halichoeres) javanicus Bleeker, Nat. Tijdschr. Ned. Indië XIII, 1857, p. 341.
Julis (Halichoeres) javanensis Bleeker, ibid. p. 479.
Halichoeres javanicus Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 286. — Atl. Ichth. I, 1862, p. 125.
Platyglossus javanicus Günther, Cat. Brit. Mus. IV, 1862, p. 145.
Platyglossus javanicus Kner, Novara Exp. Fische I, 1865, p. 255.
Platyglossus javanicus Day, Fishes of India, Suppl. 1888, p. 803.
Platyglossus javanicus Pfeffer, Jahrb. d. Hamburg. Wiss. Anst. X, 1893, p. 19.

D. IX. 12. A. III. 12. P. 2. 13. V. I. 5. Ll. circa 26. Ltr. $\begin{array}{c}2\\ \hline 1\\ \hline 9\end{array}$.

Height 3—3.5, 3.5—4.3 in length with caudal. Head 3—3.4, 3.5—4.1 in length with caudal. Height of head 1.3—1.4 in its length. Eye 5.1—6, 1.6—2.2 in snout and slightly less than somewhat convex interorbital space. Mouth horizontal, moderate. Maxillary not quite reaching to below anterior nostril. Teeth pointed, crowded, increasing in size anteriorly, the foremost pair in both jaws moderate canines, the next pair caninoid, curved backwards. About 12 rows of scales before dorsal. Head naked. First dorsal spine about as long as eye, the last one about equal to snout. Longest dorsal ray somewhat longer than last spine. First anal spine minute, third about equal to snout. Ventrals as long as postorbital part of head. Pectorals equal to head without snout. Caudal rounded. Colour of preserved specimens yellowish brown. Traces of dark longitudinal bands on head and of a vertical dark blotch behind eye. Many scales of back and upper part of sides of body and tail with reddish brown markings, forming reticulate figures more or less arranged in a row. A small triangular black blotch superiorly in pectoral axil. Fins hyaline, with indications of dark bordered light ocelli along the base of the dorsal. Length 113 mm.

Habitat: Singapore; Java (Patjitan, Karangbollong). — Zanzibar, Ceylon, Hongkong! In sea.

Note. I have examined one of the typical specimens in the Leiden Museum. It is not in a very good state, the colour is uniform brown now, without any markings on the head or traces of the yellow round spots on dorsal and caudal described by Bleeker. I have compared it with three specimens from Hongkong, identified by Seale as *H. javanicus* and which agree with the typical specimen excepting the colouration, which fairly corresponds with that given by Bleeker. In describing the markings of the species I have used the Hongkong specimens.

37. **Halichoeres podostigma** (Blkr.)

Julis (*Halichoeres*) *podostigma* Bleeker, Nat. Tijdschr. Ned. Indië VI, 1854, p. 332.
Halichoeres podostigma Bleeker, Atl. Ichth. I, 1862, p. 126.
Platyglossus podostigma Günther, Cat. Brit. Mus. IV, 1862, p. 160.
Halichoeres podostigma Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 297.

D. IX. 12. A. III. 12. P. 2.12. V. I. 5. Ll. 28. Ltr. $\begin{array}{c}2\frac{1}{2}\\ \hline 1\\ \hline 8\text{—}9\end{array}$.

Height 3.4, 4.1 in length with caudal. Head 3.1, 3.7 in length with caudal. Height of head 1.1 in its length. Eye 3.8, 1.1 in snout and slightly more than scarcely convex interorbital space. Mouth small, horizontal. Maxillary not quite reaching to below anterior nostril. Scales beginning on upper part of head above hindborder of eye. About 12 rows of scales before dorsal. Dorsal spines increasing in size posteriorly, the first less than eye, the last more than eye. Soft dorsal higher than spinous part. First anal spine very small, third longest, about equal to eye. Soft anal similar to soft dorsal. Pectorals as long as head without snout, ventrals equal to snout and eye together. Caudal rounded. Colour of preserved specimens: Head and anterior part of body before a line connecting origin of dorsal, base of pectorals and tip of ventrals, light pinkish. Rest of body darker reddish. All the scales with dark brown borders, giving a reticulate appearance. Posterior part of caudal peduncle again light pinkish. Head with dark bands from maxillary to eye and behind eye; several dark blotches on opercle and cheek; these bands and blotches may be obsolete, leaving only a bluish spot behind eye. Dorsal light with darker vertical or nearly vertical bands, narrowly bordered with still darker and more or less connected transversely, forming indistinct light ocelli. A dark spot between last dorsal rays in young. Anal light with similar bands as on dorsal but darker. Pectorals hyaline with a rather broad dark band along its base. Axil of pectoral dark as also a narrow vertical band above it. Ventrals hyaline with a large dark spot in the middle of the fin in young. Caudal light yellowish. Length 185 mm.

Habitat: Celebes (Cape Kait, Libani Bay); Sulu Islands!; Ambon; Buru; Flores!. — Philippines. In sea.

Doubtful Species

Platyglossus bivittatus (Bl.). This Atlantic species is mentioned in a list of fishes by A. B. Meyer (Cat. peces Ind. orient. Ann. Soc. Esp. Hist. Nat. XIV 1885, p. 36) as having been caught at the Sangi Islands.

29. **Pseudocoris** Bleeker

(Bleeker, Proc. Zool. Soc. London 1861, p. 411)

Oblong, compressed. Body covered with small scales. Lateral line running anteriorly along the upper part of the sides, posteriorly it is sharply deflected and runs along the middle of the caudal peduncle. Head naked. Mouth small. Teeth conical, in a single series on sides of jaws, in a few rows near symphysis. A short canine at corner of mouth, two canines in each jaw anteriorly, those of the upper jaw curved outwards, those of the lower jaw straight. Teeth of lower pharyngeals conical, the median ones of

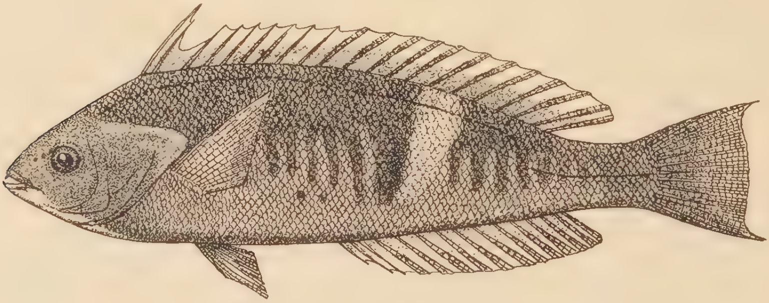

Fig. 35. *Pseudocoris heteropterus* (Blkr.). Type of *Coris bleekeri* (Hubrecht). × $^2/_3$

the posterior series not larger than the others. Dorsal consisting of IX spines and 12 rays. The first and second dorsal spines flexible and produced, connected by a low membrane with the following spines which are slightly pungent. Anal with III spines and 12(13) rays. Pectorals and ventrals pointed. Caudal emarginate, with the outer lobes produced into long filaments in the adults. Gillmembranes attached to isthmus.

Distribution: that of the single species known.

1. **Pseudocoris heteropterus** (Blkr.) (Fig. 35, p. 238)

Julis (Halichoeres) heteropterus Bleeker, Acta Soc. Sc. Indo-Neerl. II, 1857, p. 78.
Pseudocoris heteropterus Bleeker, Proc. Zool. Soc. London 1861, p. 411. — Atl. Ichth. I, 1862, p. 98.
Coris heteroptera Günther, Cat Brit. Mus. IV, 1862, p. 206. — Fische der Südsee III, 1909, p. 283.
Coris Bleekeri Hubrecht, Ann. Mag. Nat. Hist. XVII, 1876, p. 214.

D. IX. 12. A. III. 12 (13). P. 2. 11. V. I. 5. Ll. 74—76. Ltr. $\begin{array}{c}5-6\\\hline 1\\\hline 23-26\end{array}$.

Height 2.9—3.7, 3.5—4.3 in length with caudal. Head 3.3—3.7, 4—4.3 in length with caudal. Height of head 1.1—1.3 in its length. Eye 6—6.9, 1.6—2 in snout and 1.4—1.9 in convex interorbital space. Mouth oblique, rather small, moderately protractile. The maxillary, the posterior extremity of which is scarcely covered by the preorbital, reaches to below anterior nostril. Lips rather thin. Teeth conical in a single series in sides of jaws, in a few rows near symphysis. A short canine at corner of mouth, two canines in each jaw anteriorly, those of the upper jaw curved outwards, those of the lower jaw straight. Preopercle smooth. Head naked, excepting above, where the scales begin behind eye. About 20 transverse rows of scales before dorsal. These rows generally separated into right and left halves by a median scaleless stripe, which connects the scaleless occipital part of the head with the base of the first dorsal spine. The first and second dorsal spines flexible and produced, as long as postorbital part of head or as head without snout, connected by a low membrane with the following spines, which are much lower and slightly pungent. Last dorsal spine about equal to eye and snout together. Soft dorsal not higher than posterior part of spinous dorsal. Anal spines less flexible and more pungent than dorsal ones, the third longest and about equal to one eye diameter and a half. Soft anal similar to soft dorsal. Caudal emarginate or slightly rounded, with the outer lobes produced into long filaments in the adults. Pectorals with a rather narrow base, pointed, equal to head without snout. Ventrals pointed, equal to eye and snout together. Head and body dark reddish brown, somewhat lighter below. A dark blotch on opercular flap. About 8 transverse dark brown bands on posterior part of body and tail, the first about 10 scales broad ends at anus, the following are much narrower, about 3 scales broad, tapering ventrally and somewhat narrower than interspaces. The second reaches to anal spines, the third and fourth to anterior anal rays; the following reach not so far down, the last on caudal peduncle is again broader and fuses with the dark brown, almost black colour of the base of the caudal fin and of the caudal lobes and their filaments. The rest of the caudal is yellowish, the rays tinged with reddish brown. Dorsal dark violet. Anal creamy at base, dark violet distally. Pectorals light yellowish, ventrals reddish, the outer ray and the point blackish. These are the colours of a specimen of 220 mm, almost the same length as the type and agreeing with it in colouration, but in a specimen of 145 mm, which is more slender, the bands on the body are absent, excepting the last one at base of caudal. The anal is light reddish at base and distally, and there is a row of faint white spots along its base. In another specimen, the type of *Coris bleekeri*, 144 mm long, there are about 8 vertical bars in the anterior part of the body, the first below origin of dorsal. These bands anastomoze partly in an irregular way, the pattern of the right and left sides being quite different. A broad black band runs downwards from below the third to fourth dorsal rays, followed by a broad chalky white band, tapering inferiorly and occupying superiorly the space below the fourth to seventh dorsal rays. Behind this white blotch there are again about 7 narrow dark vertical bands and finally a broad, rather diffuse dark band runs along base of caudal. Membrane between anterior dorsal spines dark, rest of dorsal dark with a broad terminal longitudinal creamy border. Anal creamy. Caudal creamy, the lobes dusky. Pectorals and ventrals yellowish.

Habitat: Ambon!; Ceram!. — Philippines: China?, Tahiti.

Note. Only 5 specimens of this species are known, viz. Bleeker's type, 215 mm, which I examined in the British Museum, a specimen from Tahiti, described by Günther l.c. as totally brown without bands, two specimens from the Philippines, which I described above as well as the type of *Coris bleekeri,* which certainly belongs to *P. heteropterus.* Hubrecht says that there are no posterior canines, but he overlooked a very small one at the posterior end of the premaxillary. The chalky white band on the body is a striking feature of this specimen, but as we know that similar bands occur in specimens of other labroid fishes, which normally lack them, f.i. in *Hologymnosus semidiscus,* there is no reason to consider its presence as a specific character. Possibly such bands are the remains of a juvenile coat. I have seen another specimen from the Philippines, 122 mm long, which I label with some doubt as *heteropterus* as the dorsal spines are rigid and somewhat pungent and the anterior ones are not prolonged. In other respects it agrees with the specimens described above.

The locality China is uncertain. Bleeker records it with a query in a list of fishes from China (Ned. Tijdschr. Dierk. IV (1871), 1872, p. 135).

30. **Coris** Lacepède

(Lacepède, Hist. Nat. Poissons III, 1802, p. 96)

Julis Cuvier, Bull. Soc. Philom. Paris 1814, p. 90.

Oblong or elongate, compressed. Body covered with small scales, about 50—80 in the lateral line which is not interrupted and which runs along the upper part of the body anteriorly; it is sharply deflected posteriorly and continued on middle of caudal peduncle. Head naked or a few scales behind the eye. Mouth moderate. A single series of pointed conical teeth in the jaws, increasing in size anteriorly, the foremost being canines. A few rows of very small granular teeth may be present on the lingual side of this series. A posterior canine present or absent. Teeth on lower pharyngeals more or less graniform, the median ones of the posterior row larger than the others. Dorsal consisting of IX spines and 12 rays, the anterior spines may be elongate, flexible and more or less distant from the following. Anal with III spines and 12 rays. Pectorals more or less rounded. Ventrals pointed. Caudal truncate or rounded.

Distribution: East Atlantic, Mediterranean, Red Sea, Indic and West Pacific.

Key to the Indo-australian species of Coris

I. Lateral line 70—80.
  1. The two anterior dorsal spines flexible, produced, following pungent. Generally

a canine at corner of mouth. Reddish brown, caudal light yellowish. Posterior part of body with blue ocelli. Caudal peduncle deep, its depth equal to postorbital part of head . . . . 1. *C. gaimardi* p. 242.

2. All spines pungent, none of them produced. Reddish with large white, black edged blotches on superior part of head, body and tail . . . . 2. *C. greenovii* p. 246

II. Lateral line 53—64.

1. Ll. 64. Dorsal spines flexible. Dark brown, bluish black blotch on operculum. Young with broad light transverse bands before anal . . . . 3. *C. aygula* p. 247

2. Ll. 52—55. Dorsal spines pungent. About 7 transverse dark bands on back. . . . 4. *C. variegata* p. 249

3. Ll. 53. Dorsal spines more or less pungent. Body with longitudinal light bands. Dark patch at base of caudal . . . . 5. *C. caudimacula* p. 251

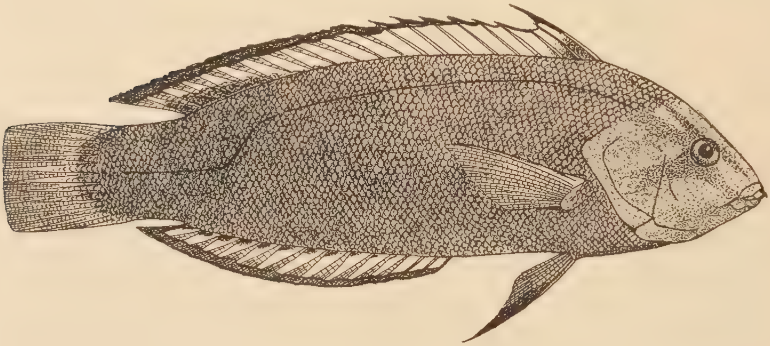

Fig. 36. *Coris gaimardi* (Q. G.) × 4/9.

1. **Coris gaimardi** (Q. G.) (Fig. 36, p. 242)

Julis Gaimard Quoy & Gaimard, Voyage Uranie & Physicienne, Zool. 1824. p. 265.

Labrus formosus Bennett, Fishes of Ceylon 1834, p. 16.

Julis Gaimardi Cuvier & Valenciennes, Hist. Nat. Poissons XIII, 1839, p. 500.

Julis (*Halichoeres*) *formosus* Bleeker, Nat. Tijdschr. Ned. Indië VI, 1853, p. 169.

Coris Gaimardi Günther, Ann. Mag. Nat. Hist. VIII, 1861, p. 387. — Cat. Brit. Mus. IV, 1862, p. 200.

Coris Gaimardi Bleeker, Atl. Ichth. I, 1862, p. 99.

Coris formosa Bleeker, l.c.

Coris pulcherrima Günther, Cat. Brit. Mus. IV, 1862, p. 200.

Coris formosa Günther, ibid. p. 201. — Fishes of Zanzibar 1866, p. 100.

Coris formosa Day, Fishes of India, Prt. 3, 1877, p. 407.
Coris pulcherrima Steindachner, Denkschr. Akad. Wien LXX, 1900, p. 507.
Coris pulcherrima Seale, Occas. Papers B. P. Bishop Mus. I, 1901, p. 87.
Julis gaimard Jenkins, Bull. Fish. Comm. XXII, (1902) 1904, p. 460.
Julis pulcherrima Jenkins, l.c.
Julis gaimard Jordan & Evermann, ibid. XXIII, (1903) 1905, p. 305.
Julis pulcherrima Jordan & Evermann, l.c.
Julis pulcherrima Jordan & Seale, Bull. Bur. Fish. XXV (1905), 1906, p. 304.
Coris gaimardi Günther, Fische der Südsee III, 1909, p. 277.
Coris pulcherrima Günther, ibid. p. 278.
Julis pulcherrima Kendall & Goldsborough, Mem. Mus. Comp. Zool. XXVI, N° 7, 1911, p. 300.
Coris pulcherrima M. Weber, Siboga Exp. Fische 1913, p. 381.
Coris Gaimard Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 311.
Coris gaimard Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 348. — ibid. XI, 1931, p. 356.
Coris gaimard P. J. Schmidt, Bull. Acad. Sc. URSS. 1930, p. 552.
Coris pulcherrima Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 319.
Coris gaimard Fowler, Acad. Nat. Sc. Philadelphia. Monogr. 2, 1938, p. 129, p. 149, p. 238.

D. IX. 12 (13). A. III. 12 (13). P. 2. 11. V. I. 5. Ll. 70—80.

Ltr. $\begin{array}{c}6-7\\ \hline 1\\ \hline 30-31\end{array}$.

Height 3.2—3.6, 3.8—4.2 in length with caudal. Head 3.2—3.4, 3.8—4 in length with caudal. Height of head 1.1—1.4 in its length. Eye 5.2—8, 1.7—2.9 in snout and 1.2—1.9 in convex interorbital space. Mouth scarcely oblique. Lips moderately thick, plated. Maxillary nearly reaching to below posterior nostril. Preopercle smooth. A row of conical teeth in the jaws, which are increasing in size anteriorly and at the same time are more and more directed forwards, the two anterior ones in each jaw much longer than the others, canines, and almost horizontal. A posterior canine at corner of mouth, only absent in a few smaller specimens examined. Scales beginning above middle of eyes. About 20 rows of scales before dorsal. First and second dorsal spines long and flexible, not pungent, the first with a filament and longer than head without snout. Third and following spines divergent from the anterior ones, pungent but flexible, the third shorter than snout, the last equal to snout. The membranes between the spines not incised. Soft dorsal not higher than spinous part, pointed behind. First anal spine somewhat longer than eye, third longest, twice as long as eye. Soft anal similar to soft dorsal. Pectorals somewhat pointed, longer than head without snout. Second and still more so second ray of ventrals produced, about one eye diameter longer than pectorals. Caudal truncate or slightly rounded. Caudal peduncle short and deep, its least depth equal to postorbital part of head. Colour of preserved specimens lighter or darker reddish brown or purple, more or less lighter below. Caudal peduncle and base of caudal generally much darker. Posterior part of body with numerous blue, black edged ocelli or dark spots, as large as a scale, sometimes almost every scale on caudal peduncle has such an ocellus, in other specimens they are more scattered and in some large ones they are absent, but this may be due to preservation. Axil of pectoral very dark brown, almost black. A yellowish vertical band, running from dorsal to anus, may be present. Head, specially snout, sometimes lighter, sometimes of the same colour as the body. A median dark line or narrow band from between eyes to origin of dorsal, often broken into spots. A similar band from snout along posterior border of eye and from here running upwards to origin of dorsal, often broken into spots or blue, black edged ocelli in its posterior part. A broader band running from corner of mouth upwards, deflected in a curve downwards and hindwards below eye and ending on hindborder of suboperculum. Another broad band from hindmargin of eye to opercular flap. These two lastnamed bands not always visible. Isthmus deep violet, the colour often continued as a broad band to origin of ventrals. A diffuse dark spot at base of two anterior dorsal spines. In young specimens the dorsal is yellowish, with a spot or ocellus at the base of each spine and ray. Similar spots or ocelli scattered on the fin, sometimes arranged in longitudinal rows. Upper part of dorsal with a dark subterminal narrow longitudinal band. In older specimens this band broadens; it is bluish and is bordered above and below by a dark line, while a third similar line runs between them. Lower part of fin with numerous small ocelli, specially posteriorly. In still larger and very dark specimens the bluish band is well developed, but the median dark line is broken into spots or ocelli. The spots at the base of the fin have fused into a more or less distinct band, leaving a light area between it and the superior band. The anal shows the same markings and colouring as the dorsal in the different specimens described. Caudal light yellowish or white, excepting the dark base. Pectorals yellowish hyaline, ventrals dark violet along their outer border, rest of fin lighter. Length over 300 mm. (Specimen of Bleeker's collection in the Amsterdam Museum examined.)

Habitat: Celebes (Makassar, Tanawanko); Talaut Islands!; Ambon; Ternate; Timor; Misol; New Guinea (Port Moresby). —

Zanzibar, Seychelles, Ceylon, Riu Kiu Islands, Philippines!, Pelew Islands, New Hebrides, Fiji, Tahiti, Paumotu Islands, Marquesas Islands, Hawaii. In sea near coral reefs, burrying in sand when at rest, according to Jordan & Evermann l.c.

Note. I follow Fowler in uniting *gaimardi, formosa* and *pulcherrima*. Bleeker distinguished *gaimardi* and *formosa* by the number of scales in the Ll. and by the absence or presence of a posterior canine. Günther (Cat. Brit. Mus. l.c.) does not find differences in the number of scales but retains the difference in absence or presence of a posterior canine, but whereas Bleeker describes such a tooth in *formosa,* Günther just the opposite declares it lacking in this species but finds it in *gaimardi*. It must however be remarked that Günther does not consider Bleeker's *formosa* to be the same as that of Bennett and he therefore proposed the name *pulcherrima* for the species of Bleeker. The difference is very slight and apparently only of colour. Day has already united *formosa* and *pulcherrima*. M. Weber is not certain of the identity of the two, as the ocelli in *formosa* are much larger, but this statement is apparently not based on the examination of specimens but on figures and descriptions. Weber suggests that there may be a western and an eastern race, but I lack material from the West Indic to investigate this question. *C. pulcherrima* and *gaimardi* have been kept apart by many authors. I cannot see on what grounds. In my material the posterior canine is generally present and is only absent in a few smaller specimens, which differ in no other respects from the others. In 1909 Günther still kept *formosa* apart from *pulcherrima* and judging from the descriptions he separates lastnamed species from *gaimardi* by the following characteristics: *C. gaimardi,* Ll. 76, posterior canine present, no bands on the lower half of the head. *C. pulcherrima,* Ll. 82—84, posterior canine generally wanting or present in a rudimentary state, head with several bands. I find the posterior canine well developed in a specimen of *formosa* of Bleeker's collection (= *pulcherrima* Gthr.), which is in accordance with Bleeker's statement. The difference in the number of scales does not hold good. In my specimens I find that the scales in the Ll. can vary between 70—80, without being accompanied by other differences. It is not true, that *gaimardi* has no bands on the lower half of the head, as they are clearly represented by Quoy & Gaimard, the authors of this species. Jordan & Evermann, 1905, l.c. who keep also *gaimardi* and *pulcherrima* apart, give no differences in their descriptions, excepting some minor details of the colouration. As we know how variable the colouration in Labrids can be and at the hand of my rather extensive material I do not doubt that *formosa, pulcherrima,* and *gaimardi* can be united.

2. **Coris greenovii** (Benn.).

Julis greenovii Bennett, Zool. Journ. IV, 1829, p. 37.
Julis (*Julis*) *leucorhynchos* Bleeker, Acta Soc. Sc. Indo-Neerl. I, 1856, p. 57.
Coris greenoughi Günther, Ann. Mag. Nat. Hist. VIII, 1861, p. 387. — Cat. Brit. Mus. IV, 1862, p. 204.
Coris greenoughi Bleeker, Atl. Ichth. I, 1862, p. 100.
Julis greenovii Jordan & Evermann, Bull. Fish. Comm. XXIII, (1903) 1905, p. 308.
Julis greenovii Jordan & Seale, Bull. Bur. Fish. XXV, (1905) 1906, p. 304.
Coris greenovii Günther, Fische der Südsee III, 1909, p. 281.
Coris greenovii M. Weber, Siboga Exp. Fische 1913, p. 382.
Coris greenovii Jordan & Jordan, Mem. Carnegie Mus. X, 1922—1925, p. 70.
Coris greenovii Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 346.

D. IX. 12 (13). A. III. 12. P. 2. 11. V. I. 5. Ll. 75—80. Ltr. $\begin{array}{c}5\text{—}7\\ \hline 1\\ \hline 28\text{—}31\end{array}$.

Height 3.6—3.8, 4.2—4.4 in length with caudal. Head 3.2—3.4, 3.7—3.9 in length with caudal. Height of head 1.4—1.5 in its length. Eye 4—6, 1.2—1.7 in snout and equal to convex or somewhat convex interorbital space. Mouth horizontal. Lips moderate. Maxillary reaching to below anterior nostril. Conical teeth in a single row in the jaws, increasing in size anteriorly, the anterior pair in both jaws moderate canines, those of the lower jaw fitting in between those of the upper jaw. No posterior canines. Scales beginning on head behind eye. About 18 rows of scales before dorsal. Dorsal spines flexible, slightly pungent; the first equal to snout, the last to snout and half diameter of eye. The membranes between the spines not incised. Soft dorsal not much higher than spinous part. Third anal spine equal to snout, longest anal rays half diameter of eye longer. Pectorals equal to head without snout. Ventrals as long as snout and eye. Caudal slightly rounded. Colour of preserved specimens pinkish or light reddish brown. Chalky white blotches, encircled by black on the superior part of head and body; the first on snout and upper lip, the second connecting upper border of both eyes; the third largest, below 3rd to 6th dorsal spines, triangular or pear-shaped, tapering below, its point covered by pectoral. Superiorly its black border extends on the dorsal fin, forming two vertical bars or a complete loop. The fourth patch is situated below soft dorsal, its black border forming a loop on basal part of dorsal. The fifth is a saddle on caudal peduncle, its black anterior border continued upwards along last dorsal rays, sometimes forming a curved branch forwards, which embraces a dark round spot at base of end of dorsal. A black band along base of caudal, superiorly sometimes connected with the posterior black border of the saddle on the caudal peduncle. Fins white, dorsal and anal with a narrow black terminal margin. Length 100 mm.

Habitat: Celebes (Menado!); Flores!; Buru; Ceram; Ambon; Nusa Laut!; Timor! — Pelew Islands, Ponapé, Samoa, Rotuma, Hawaii. In sea.

3. **Coris aygula** Lac.

Coris aygula Lacepède, Hist. Nat. Poissons III, 1802, p. 96.
Coris angulatus Lacepède, l.c.
Labrus cingulum Lacepède, ibid. p. 517.
Julis aygula Rüppell, Atlas Reise Nördl. Afrika, Fische 1828, p. 25.
Julis ruppelii Bennett, Proc. Comm. Zool. Soc. London 1831, p. 128.
Julis gibbifrons Quoy & Gaimard, Voyage Astrolabe, Zool. III, 1834, p. 707.
Labrus aureo-maculatus Bennett, Fishes of Ceylon 1834, p. 20.
Julis semipunctatus Rüppell, Neue Wirbelth. Fische 1835, p. 12.
Julis cingulum Cuvier & Valenciennes, Hist. Nat. Poissons XIII, 1839, p. 428.
Julis coris Cuvier & Valenciennes, ibid. p. 491.
Coris aygula Günther, Cat. Brit. Mus. IV, 1862, p. 201.
Coris cingulum Günther, ibid. p. 203.
Coris aygula Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 539.
Hemicoris cingulum Bleeker, Recherches fauna Madagascar. Pollen & van Dam, 4e partie. Poissons, 1875, p. 83.
Coris aygula Day, Fishes of India, Prt. 3, 1877, p. 408.
Coris aygula Macleay, Descr. Cat. Austr. Fish II, 1881, p. 99.
Coris cyanea Macleay, Proc. Linn. Soc. New S. Wales VII, 1882, p. 588.
Coris variegata Ramsay & Ogilby, ibid. (2) I, 1886, p. 131 (nec Rüpp.).
Coris aureo-maculata Ramsay & Ogilby, ibid. (2) II, 1887, p. 1024.
Coris aygula Seale, Occas. Papers B. P. Bishop Mus. I, 1901, p. 87.
Coris aygula Jordan & Snyder, Proc. U. S. Nat. Mus XXIV (1901), 1902, p. 641.
Coris aygula Jordan & Evermann, Bull. Fish. Comm. XXIII, (1903) 1905, p. 313.
Coris aygula Günther, Fische der Südsee III, 1909, p. 279.
Coris cingulum Günther, ibid. p. 280.
Coris aygula Jordan, Tanaka & Snyder, Journ. Coll. Sc. Univ. Tokyo XXXIII, Art. 1, 1913, p. 203.
Coris angulata Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p 303.
Coris angulata Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 345.
Coris aygula Marshall, Mem. Queensl. Mus. IX, Prt. II, 1928, p. 190.
Coris angulata P. J. Schmidt, Bull. Acad. Sc. URSS, 1930, p. 551.
Coris aygula Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 318.

Coris cyanea Whitley, Austral. Zool. VIII, Prt. 4, 1937, p. 227.
Coris aygula Fowler, Acad. Nat. Sc. Philadelphia, Monogr. N° 2, 1938, p. 149.

D. IX. 12 (13). A. III. 12. P. 2. 12. V. I. 5. Ll. 64. Ltr. $\begin{array}{c}4+3\\\hline 1\\\hline 25\end{array}$ 1).

Height 3, 3.5 in length with caudal. Head 3.1, 3.6 in length with caudal. Height of head 1.1 in its length. Profile of head concave in large specimens with a hump behind the interorbital space. Eye 7.7, 2.5 in snout and twice in very convex interorbital space. Mouth somewhat oblique, lips thick, the upper one plated. Maxillary reaching to below anterior nostril. Teeth in jaws pointed, directed forwards, increasing in length anteriorly, the two anterior teeth in each jaw strong canines. One or two very blunt teeth at corner of mouth. Anteriorly some blunt teeth at the lingual side of the main row. Preopercle smooth. Head naked, excepting above, where the scales begin above eye. About 15 rows of small scales before dorsal, the anterior rows somewhat rudimentary and imbedded in the skin. Similar small scales between isthmus and ventrals. Dorsal spines flexible, not pungent, the first and second close together, longer than the others in large specimens, about equal to snout and eye together, connected with the following spines, which are much shorter, by a low membrane. Last dorsal spine equal to snout. Soft dorsal slightly higher than posterior part of spinous dorsal, pointed behind. Anal spines flexible, third longest, somewhat shorter than snout. Soft anal similar to soft dorsal. Pectorals rounded, equal to head without snout. Ventrals with the second and third rays greatly produced in large specimens, reaching on anal, less than half length of snout shorter than head. Caudal truncate, in large specimens the outer and some of the median rays are produced beyond the finmembrane. Colour of a large preserved specimen dark brown, fins darker brown. A bluish black blotch on opercular flap. Hind-border of pectorals grey. In young specimens, up to 260 mm, there is a broad light transverse band on body just before anal, and head and body before this band are of another colour (lighter or darker) than that of posterior part of body and tail. Head with dark spots and stripes, which may also be present on anterior part of body. Fins with dark spots, soft dorsal and anal with subterminal bands. Length over 1100 mm.

Nomen indig. Gira-Gira (Port Moresby).

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1) Four rows of scales above the lateral line and besides three rows of small scales forming the dorsal sheath.

Habitat: New Guinea (Port Moresby). — Mauritius, Réunion, Seychelles, Red Sea, Coast of British India, Japan, Riu Kiu Islands, Philippines!; North Queensland, Norfolk Island, Middleton Reef, Lord Howe Island, Guam, Solomon Islands, New Hebrides, Society Islands, Tubuai, Hawaii.

Note. *Coris cingulum* is the young of this species. Klunzinger l.c. says that the transition of the colour of the young in that of the adults is clearly visible in specimens of medium length. They miss the hump on the head, the elongate anterior dorsal spines and the ventral rays are not produced.

4. **Coris variegata** (Rüpp.).

Halichoeres variegatus Rüppell, Neue Wirbelth. Fische 1835, p. 14.
Julis variegatus Cuvier & Valenciennes, Hist. Nat. Poissons XIII, 1839, p. 462.
Julis (*Halichoeres*) *batuensis* Bleeker, Nat. Tijdschr. Ned. Indië XII, 1856—1857, p. 240.
Julis (*Halichoeres*) *Schröderii* Bleeker, Acta Soc. Sc. Indo-Neerl. III, 1858. Tiende bijdr. vischf. Amboina, p. 2.
Hemicoris variegatus Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 283. — Atl. Ichth. I, 1862, p. 106.
Hemicoris batuensis Bleeker l.c. — ibid. p. 107.
Coris variegata Günther, Cat. Brit. Mus. IV, 1862, p. 198.
Coris batuensis Günther, ibid. p. 199.
Coris variegata Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 540.
Coris variegata Kossmann & Räuber, Verh. Naturh. Med. Vereins Heidelberg I, 1876, p. 34.
Coris papuensis Macleay, Proc. Linn. Soc. New S. Wales VIII, 1883, p. 275.
Coris variegata M. Weber, Siboga Exp. Fische 1913, p. 382.
Coris variegata Fowler & Bean, Bull. U. S. Nat. Mus. 100 Vol. VII, 1928, p. 304.
Coris batuensis Fowler & Bean, ibid. p. 306.
Coris variegata Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 347.
Coris papuensis Fowler, ibid. p. 349.

D. IX. 11. A. III. 11 (12). P. 2. 12. V. I. 5. Ll. 52—55. Ltr. $\begin{array}{c}5\\\hline 1\\\hline 19\end{array}$.

Height 3.1, 3.8 in length with caudal. Head 3.2, 3.9 in length with caudal. Height of head 1.3 in its length. Eye 5.7, 1.8 in snout and 1.3 in convex interorbital space. Mouth horizontal, moderate, the maxillary not quite reaching to below anterior nostril. Lips rather thick, the upper lips plated. Teeth pointed, more or less directed forwards. One or two canines at corner of mouth. Two canines in each jaw anteriorly. Head naked, excepting above, where the scales begin above hindborder of eye. About 15 rows of scales before dorsal, these scales much smaller than those of the body. Similar small scales between isthmus and ventrals. Dorsal spines stiff and pungent, slightly increasing in length posteriorly, the last one about as long as snout. Longest dorsal rays somewhat longer than longest spine. Third anal spine longer than the others, about equal to one eye diameter and a half. Soft anal similar to soft dorsal. Pectorals equal to head without snout. Ventrals with the first ray produced as long as pectorals. Caudal rounded. Least height of caudal peduncle equal to snout and eye together. Colour of preserved specimens yellowish brown, lower side of head and thorax lighter. Scales of belly each with a more or less distinct pearly white spot. About 7 dark brown transverse bands on back, narrower or broader than interspaces, not reaching further downwards than middle of sides; the first on nape, the second at origin of dorsal, the third below median and the fourth below last spine of dorsal, the fifth and sixth below soft dorsal and the seventh on caudal peduncle. These bands sometimes indistinct. A light bluish band from eye to upper lip, another on cheek, more or less parallel to the first. A dark vertical blotch behind eye and a dark spot in temporal region below the second band may be present. A dark blotch between the first and second dorsal spines and a much larger elongate one between first to third dorsal rays. These blotches often indistinct. Sometimes also a dark spot on posterior dorsal rays. Other fins without markings. A dark brown stripe along base of pectoral, widening into a triangular blotch on base of anterior rays. Length 164 mm.

Habitat: Batu Islands; Sulu Islands; Ambon; Timor; Kei Islands!; South New Guinea! — Red Sea, Riu Kiu Islands, Philippines, New Hebrides, Hawaii?. In sea.

Note. *Hemicoris batuensis* Blkr. differs only from *variegata* in being somewhat more elongate. Bleeker's single specimen was much discoloured, but the markings visible were the same as in *variegata*. I have no doubt that they are of the same species. Fowler & Bean described *batuensis* anew (l.c.) on 3 specimens from the Philippines, but these specimens are not more elongate than those of *variegata*, described by the same authors and the difference in colour is too slight to be of specific value.

I have added *Coris papuensis* Macl. to the synonymy, although Macleay gives as formula for the dorsal: D. IX. 14. His description otherwise agrees so entirely with that of my specimens of *variegata*, that I suppose 14 dorsal rays is a misprint.

5. **Coris caudimacula** (Q. G.)

Julis caudimacula Quoy & Gaimard, Voyage de l'Astrolabe, Zool. 1834, p. 710.
Julis caudimacula Cuvier & Valenciennes, Hist. Nat. Poissons XIII, 1839, p. 426.
Hemicoris caudimacula Bleeker, Versl. Akad. Amsterdam XIII, 1862, p. 283. — Atl. Ichth. I, 1862, p. 106.
Coris caudimacula Günther, Cat. Brit. Mus. IV, 1862, p. 205. — Fishes of Zanzibar 1866, p. 101.
Coris caudimacula Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 540.
Coris caudimacula Barnard, Ann. S. Afric. Mus. XXI, 1925—1927, p. 750.

D. IX. 12 (13). A. III. 12 (13). P. 2. 11. V. I. 5. Ll. 53.

Ltr. $\begin{array}{c}3\\\hline 1\\\hline 19-20\end{array}$.

Height 3.6, 4.3 in length with caudal. Head 3.5, 4.2 in length with caudal. Height of head 1.4 in its length. Eye 5.6—5.8, 1.6 in snout and 1—1.1 in somewhat convex interorbital space. Mouth horizontal, lips somewhat swollen. Maxillary reaching scarcely to below anterior nostril. Teeth in the jaws anteriorly in two rows, posteriorly in one row, conical with rounded tip, increasing in size anteriorly, the four anterior teeth in the upper jaw and the two anterior ones in the lower jaw canines. Posterior canines present. Scales beginning behind eye. About 16 rows of scales before dorsal, the anterior rows separated into a right and left half by a scaleless median strip. Dorsal spines somewhat pungent, the first one hardly so. First and second separated by a deep notch in the membrane between the second and third from the following spines. First spine equal to eye and snout, second much shorter, last spine about as long as first. Soft dorsal higher than spinous part, pointed behind, its longest ray equal to postorbital part of head. First anal spine about one half length of second, which again is one half of third. Lastnamed spine as long as snout. Soft anal similar to soft dorsal, pointed behind. Caudal rounded. Pectorals as long as head without snout; ventrals with the first ray much produced, slightly longer. Colour of preserved specimens reddish brown. Three longitudinal light brown bands, first from head, along lateral line, getting indistinct below soft dorsal; second parallel to first from behind opercular flap, third above origin of pectorals, posteriorly continued as a greyish blue band, with oblique incomplete branches, directed posteriorly. A dark blotch on opercular flap. A light brown band from corner of mouth to eye, and indistinctly continued backwards to opercular flap, where it joins the second band on body. Head above this band dark, light below. Thorax and belly light. An oblique brownish band before base of pectoral, posteriorly followed by a second band, running downwards from pectoral axil and curved in a posterior direction before attaining ventral profile, and running above base of anal. A faint brownish band from isthmus to base of ventrals and beyond. Membranes between 1st to 3rd dorsal spines black, rest of fin light brown, with white edged darker stripes or ocelli, arranged in two or three rows. Anal with cloudy blotches in its basal part and with two parallel longitudinal narrow brown bands. Caudal with a large triangular black blotch at its base and with oblique parallel brown bands in its distal part, cutting off more or less the tips of the lobes from the rest of the fin. Pectorals and ventrals light reddish or brownish. Length 148 mm (Specimens of Bleeker's collection from Madagascar in the Leiden Museum examined).

Habitat: Java. — Coast of Natal, Madagascar, Zanzibar, Mauritius. In sea.

Note. According to Fowler (Mem. B. P. Bishop Mus. X, 1928, p. 354) the fish recorded by Seale (Occas. Papers B. P. Bishop Mus. IV, 1906, p. 57) as *Coris caudimaculatus* (Q. G.) from Rarotonga is not this species but *Thalassoma lutescens* (Lay & Benn.). The occurrence in the Indo-australian Archipelago is not certain, as it is only based on the specimen labelled "Java", which Bleeker saw in the old collection of the Amsterdam Museum.

31. **Hologymnosus** Lacepède

(Lacepède, Hist. Nat. Poissons III, 1802, p. 556)

Elongate, compressed. Body covered with very small scales, 101—108 in the lateral line, which is not interrupted and which runs anteriorly in the upper part of the body; it is sharply deflected posteriorly and continued on the middle of the caudal peduncle. Head naked. Mouth moderate. A row of crowded teeth in the jaws, the anterior ones canines. No posterior canine. Teeth on lower pharyngeals conical, the median ones of the posterior row not larger than the others. Dorsal consisting of IX spines and 12 rays, all the spines flexible and not pungent. Anal consisting of III spines and 12 rays. Pectorals triangular. Ventrals pointed. Caudal truncate, the outer rays prolonged.

Distribution: that of the single species known.

1. **Hologymnosus semidiscus** (Lac.) (Fig. 37, p. 254)

Labrus semidiscus Lacepède, Hist. Nat. Poissons II, 1802, p. 429.
Labrus doliatus Lacepède, l.c.
Labrus annulatus Lacepède, ibid. p. 455.
Hologymnosus fasciatus Lacepède, ibid. p. 556, p. 557.
Julis rosea Quoy & Gaimard, Voyage de l'Astrolabe, Zool. 1834, p. 769.
Julis annulatus Cuvier & Valenciennes, Hist. Nat. Poissons XIII, 1839, p. 501.
Julis doliatus Cuvier & Valenciennes, ibid. p. 504.
Julis (Julis) annulatus Bleeker, Nat. Tijdschr. Ned. Indië IX, 1855, p. 311.
Julis (Julis) oxyrhynchos Bleeker, ibid. XIII, 1857, p. 74.
Hologymnosus fasciatus Bleeker, Atl. Ichth. I, 1862, p. 96.
Coris elongata Günther, Cat. Brit. Mus. IV, 1862, p. 201.
Coris annulata Günther, ibid. p. 202.
Coris longipes Günther, ibid. p. 204.
Coris (Hologymnosus) taeniatus Steindachner, Verh. zool. bot. Ges. Wien XIII, 1863, p. 1189. — ibid. XIV, 1864, Tafel II, Fig. 1.
Coris aygula Day, Fishes of India II, 1878—1888. Pl. LXXXVIII, fig. 5 (nec Lac.).
Coris annulatus Day, Fauna of Br. India, Fishes II, 1889, p. 419.
Coris (Hologymnosus) doliata Sauvage, Poissons de Madagascar 1891, p. 462.
Coris elongata Günther, Fische der Südsee III, 1909, p. 279.
Coris annulata Günther, ibid. p. 280.
Coris longipes Günther, ibid. p. 281.
Coris annulata Snyder, Proc. U. S. Nat. Mus. XLII, 1912, p. 507.
Hologymnosus semidiscus Barnard, Ann. S. Afric. Mus. XXI, 1925—1927, p. 748.
Hologymnosus semidiscus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 313.
Hologymnosus semidiscus Fowler, Mem. B. P. Bishop Mus, X, 1928, p. 349.
Hologymnosus fasciatus Borodin, Bull. v. d. Bilt Marine Mus. I, 1930, p. 60.
Hologymnosus semidiscus Fowler, Proc. Acad. Nat. Sc. LXXXVI (1934) 1935, p. 492.

D. IX. 12. A. III. 12. P. 2. 11—12. V. I. 5. Ll. 101—108.

Ltr. $\begin{array}{c}6\\\hline 1\\\hline 47-48\end{array}$.

Elongate, compressed, much more slender in young than in old ones, especially the head is much more pointed in young than in adults. Height 3—4.9, 3.8—5.6 in length with caudal. Eye 7—8.5, 1.1—1.7 in interorbital space, which is almost flat in young ones and very convex in old specimens. Eye 2.4—3.2 in snout. Lips not very thick, plated. Mouth horizontal, reaching to below anterior nostril. Teeth conical, in a crowded row in both jaws. The four anterior teeth in each jaw much longer, specially the two front ones, which are directed forwards and canine-like, the following pair somewhat curved backwards at their extremity. Inside this row the jaws are paved with very small low granular teeth. Dorsal of nearly the same height in its whole length, the first spine longer than eye, the longest ray about twice length of eye, or thrice and more in large specimens, the fin pointed behind. Dorsal membranes not incised. Anal beginning below first dorsal ray, similar to dorsal. The first anal spine small, the third longest and somewhat more than eye and only slightly shorter than the rays. Pectorals equal to or slightly longer than postorbital part of head. Ventrals equal to or shorter than snout. Sometimes the first ventral ray is produced into a filament. Caudal truncate, the outer rays produced, more so in old than in young. Colour of preserved specimens reddish brown, lighter below. Head with light blue or dark brown bands, bordered by narrow black lines. These bands only visible in well preserved specimens. One band running obliquely from occiput where it meets that of the other side, along frontborder of eye and ending above posterior part of mouth. A second one from lower border of eye, parallel to the first to behind corner of mouth. Two parallel or somewhat diverging ones from hindborder of eye, running obliquely upwards and backwards to upper part of operculum. These bands often remain in specimens where traces of other bands have disappeared. Another band runs from inferior border of eye or some distance below it to opercular flap, where it ends in a black patch, sometimes bordered by light blue behind. Body with about 18 vertical bands, narrower than the interspaces. In well preserved specimens these bands are light blue ventrally, with an irregular narrow brown border. In some specimens these bands are deflected and bent angularly in their ventral course. In several specimens examined there is a broad vertical creamy band beginning below dorsal and ending on belly in the interspace between tip of ventrals and origin of anal and bordered by two of the dark vertical bands. Generally this light band is narrower above, broadening below and pushing as it were the dark bands aside. Two or three dark or light

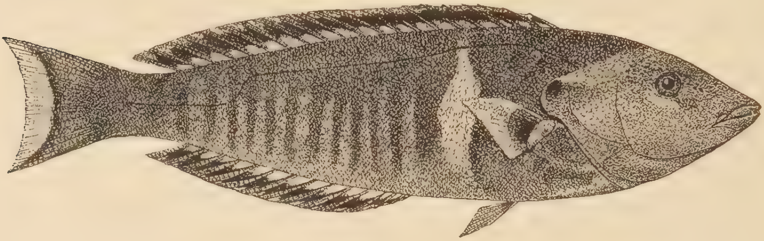

Fig. 37. *Hologymnosus semidiscus* (Lac.). × 1/3

blue short bands may be present behind axil of pectoral, which in this case also shows a blue or dark band on its basal part. Dorsal and generally also anal with a more or less wedge shaped lighter or darker blue spot between each ray, the point directed to the base of the fin, the broadest part of the wedge generally confluent with its neighbours in large specimens and forming a continuous longitudinal band. A dark subterminal and a white terminal longitudinal band often present, in one specimen with a row of blue spots on the anal in the interspace between the subterminal band and the band formed by the wedge shaped blotches. Caudal brown, sometimes mottled or irregularly banded with blue, the distal part of the fin, excepting the outer rays, always creamy. Ventrals creamy. One specimen is yellowish brown above, creamy below, the two colours sharply defined. Traces of vertical bands only on the median part of the body, where they form a row of elongate cloudy gray spots, bordered below with white and forming incomplete ocelli, suggesting a dark lateral band. Anteriorly these spots fuse into one large patch, covered by the pectoral, some of the scales deep black. Length 350 mm.

Habitat: Simalur!; Java; Celebes (Makassar, Menado); Flores; Buru; Ambon; Banda!; New Guinea (Port Moresby). — Coast of Natal, Madagascar, Zanzibar, Mauritius, Réunion, Seychelles, Coasts of British India, Riu Kiu Islands, Philippines!, Pelew Islands, New Hebrides, Pacific Islands eastwards to Hawaii and Society Islands. In sea.

Note. This species is very variable in colour. The young ones are banded longitudinally. These bands are more or less dissolved in rows of spots, which spots grow out in dorso-ventral direction and form transverse bands. In some specimens these bands dissappear, in others they remain as rows of spots, which can partly coalesce and form rows of large blotches.

2. Family SCARIDAE

Mouth not protractile. Maxillary firmly attached to premaxillary. Jaws short forming a beak, recalling the beak of a parrot and covered on the outer side with several rows of teeth, which are soldered together into a broad, convex cutting lamina. Pointed caninoid or canines may be present on the labial as well as on the lingual side of the jaw. The upper lip is double, the inner lip either developed in its whole circuit, or only developed posteriorly, and the anterior extremity adnate to the outer lip. Dentigerous portion of the lower pharyngeal quadrangular, with longitudinal series of transversely expanded linear teeth forming a pavement; upper pharyngeals similarly toothed, produced upwards into vertical plates with thickened convex upper edges moving backwards and forwards in a pair of grooves on the parasphenoid. Scales large. Dorsal with IX stiff or flexible spines.

Key to the Indo-australian genera of Scaridae

1. Cheek with a single series of scales.
   a. Inner upper lip developed in its whole circuit, separated from the outer lip. Teeth in upper jaw coalesced, in the lower jaw in superposed rows 1. *Leptoscarus* p. 256.
   b. Inner upper lip only developed posteriorly, its anterior end adnate to outer lip. Teeth in the jaws anteriorly imbricate . . . . 2. *Cryptotomus* p. 260.
2. Cheek with two to four series of scales. Inner upper lip only developed posteriorly. Teeth coalesced to plates, covering the jaw . . . . 3. *Callyodon* p. 265.

1. **Leptoscarus** Swainson

(Swainson, Nat. Hist. Fishes etc. II, 1839, p. 226)

Scarichthys Bleeker, Acta Soc. Sc. Indo-Neerl. VI, 1859. Enumeratio spec. piscium etc. p. 106.

Elongate, compressed. Body covered with large scales. Head naked, with exception of a single transverse row of large scales on the cheek and a few rows of scales on opercle. Scales beginning above or immediately behind eye with a large median one. Inner

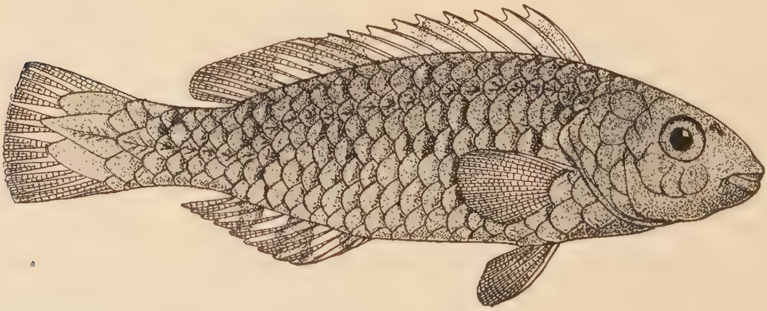

Fig. 38. *Leptoscarus vaigiensis* (Q. G.) × $^3/_4$

upper lip developed in its whole circuit, more or less crenulated along its free border, covered by the thin outer upper lip. Dentition of upper jaw consisting of coalesced teeth, forming a lamina with a denticulated free edge, the individual teeth scarcely visible. Canines, situated on the superior part of this lamina and more or less directed outwards in a horizontal position, present or absent. Teeth of lower jaw also soldered together but the oblique superposed rows which run upwards from behind to the symphysis, are generally clearly visible. Anterior nostril with an elevated rim, produced posteriorly into a small tentacle. Scales of lateral line with arborescent tubes. Lateral line interrupted or with a bent downwards posteriorly. Dorsal with IX spines and 10 (11) soft rays. Anal with III spines and 9 (10) soft rays. Caudal rounded. Gillmembranes broadly attached to isthmus.

Distribution: Two species from the tropical part of Indic and West Pacific.

Note. The reason why unfortunately the name *Leptoscarus* has to replace *Scarichthys* is explained in a note under the genus *Cryptotomus*.

Key to the Indo-australian species of Leptoscarus

a. No canines in the upper jaw	1. *L. vaigiensis* p. 257.
b. A row of canines superiorly in the upper jaw	2. *L. caeruleopunctatus* p. 259.

1. **Leptoscarus vaigiensis** (Q. G.) (Fig. 38, p. 256)

Scarus vaigiensis Quoy & Gaimard, Voyage de l'Uranie et de la Physicienne. Zool. 1824, p. 288.
Scarus vaigiensis Cuvier & Valenciennes, Hist. Nat. Poissons XIV, 1839, p. 214.
Scarus auritus Cuvier & Valenciennes, ibid. p. 218.
Scarus naevius Cuvier & Valenciennes, ibid. p. 253.
Callyodon chlorolepis Richardson, Voyage Sulphur, Fish. 1847, p. 137.
Scarus naevius Bleeker, Nat. Tijdschr. Ned. Indië III, 1852, p. 769.
Scarichthys naevius Bleeker, ibid. XIX, 1859, p. 334.
Scarichthys auritus Bleeker, Versl. Akad. Amsterdam XII, 1861, p. 243. — Atl. Ichth. I, 1862, p. 15.
Pseudoscarus? wagëensis Bleeker, Atl. Ichth. I, 1862, p. 49.
Scarichthys auritus Günther, Cat. Brit. Mus. IV, 1862, p. 213.
Scarichthys auritus Guichenot, Mém. Soc. Imp. Sc. nat. Cherbourg XI, 1865, p. 18.
Scarichthys waigiensis Guichenot, l.c.

Choerops auritum Evermann & Seale, Bull. Bur. Fish. XXVI (1906), 1907, p. 95.
Scarichthys auritus Jordan & Richardson, ibid. XXVII, (1907) 1908, p. 268.
Scarichthys auritus Günther, Fische der Südsee III, 1909, p. 299.
Scarichthys auritus Fowler & Bean, Bull U. S. Nat. Mus. 100. Vol. VII, 1928, p. 373.
Scarichthys auritus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 367.
Scarichthys auritus P. J. Schmidt, Trans. Pacif. Comm. Acad. Sc. USSR. I, 1930, p. 92.
Scarichthys auritus Fowler, Proc. Acad. Nat. Sc. Philadelphia LXXXVI, (1934) 1935, p. 493.

D. IX. 10 (11). A. III. 9 (10). P. 2. 11. V. I. 5. Ll. 25. Ltr. $\begin{array}{c}1\frac{1}{2}\\ \hline 1\\ \hline 6-7\end{array}$.

Height 3.1, 3.7 in length with caudal. Head 3.1, 3.7 in length with caudal. Eye 4.4, 1.6 in snout and 1.2 in nearly flat interorbital space. Mouth horizontal. Corner of mouth not quite reaching to below anterior nostril. Outer side of upper jaw smooth, without canines. One transverse row of scales on cheek. Four scales before dorsal. Dorsal spines flexible, not pungent, the first about equal to snout, the last half diameter of eye longer, and as long as longest branched rays. First anal spine minute, third equal to snout, the longest anal rays half diameter of eye longer. Pectorals and ventrals subequal, a little longer than postorbital part of head. Caudal rounded. Colour of preserved specimens reddish brown above, more creamy below. Many scales of body and tail with a dark brown spot. Chalky white spots, less numerous than the brown ones, on sides of body and tail, more or less arranged in longitudinal rows. Brown spots and stripes on head behind eye. Chalky white ones on lower part of cheek and chin. Dorsal with dusky spots, a large dusky blotch on membrane between first and second spines. Anal with three broad vertical dusky bands or patches. Caudal with dusky spots. Pectorals hyaline. A brown band along their base. Ventrals dusky at base and at tip, whitish in the middle. Length 318 mm.

Habitat: Sumatra (Kotaradja!); Java (Batavia, Karangbollong); Borneo (Sandakan); Celebes (Makassar, Badjoa, Menado); Haingsisi!; Gisser!; Ambon; Ceram; Banda; Timor; Aru Islands!; Waigeu; New Guinea (Manokwari, Hood Bay). — Natal, Zanzibar, Seychelles, Mauritius, China, Riu Kiu Islands, Formosa, Philippines, Guam, Ponapé, Aneitum, Lord Howe Island, North Queensland, Tonga Islands, Rarotonga. In sea.

2. **Leptoscarus coeruleopunctatus** (Rüpp.)

Scarus (*Calliodon*) *coeruleo-punctatus* Rüppell, Neue Wirbelth. Fische 1835, p. 24.
Scarus rubro-notatus Cuvier & Valenciennes, Hist. Nat. Poissons XIV, 1839, p. 212.
?*Scarus Bottae* Cuvier & Valenciennes, ibid. p. 262.
Scarus coeruleo-punctatus Cuvier & Valenciennes, l.c.
Scarus coeruleopunctatus Bleeker, Nat. Tijdschr. Ned. Indië VI, 1854, p. 110.
Scarichthys coeruleopunctatus Bleeker, Atl. Ichth. I, 1862, p. 16.
Scarichthys coeruleopunctatus Günther, Cat. Brit. Mus. IV, 1862. p. 213.
Scarichthys coeruleo-punctatus Guichenot, Mém. Soc. Imp. Sc. Nat. Cherbourg XI, 1865, p. 19.
?*Scarichthys Bottae* Guichenot, ibid. p. 20.
Scarichthys caeruleopunctatus Günther, Fishes of Zanzibar 1866, p. 103.
Scarichthys coeruleopunctatus Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 557.
Scarichthys caeruleopunctatus Day, Fishes of India, Prt. 3, 1877, p. 410.
Scarichthys coeruleopunctatus Evermann & Seale, Bull. Bur. Fish. XXVI, (1906) 1907, p. 95.
Scarichthys caeruleopunctatus Seale & Bean, Proc. U. S. Nat. Mus. XXXIII, 1908, p. 245.
Scarichthys coeruleopunctatus Günther, Fische der Südsee III, 1909, p. 300.
Scarichthys coeruleopunctatus Barnard, Ann. S. Afric. Mus. XXI, 1925—1927, p. 775.
Scarichthys coeruleopunctatus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 375.
Scarichthys coeruleopunctatus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 367.

D. IX. 10. A. III. 9 (10). P. 2. 11. V. I. 5. Ll. 25. Ltr. $\begin{array}{c} 1\frac{1}{2} \\ \hline 1 \\ \hline 6-7 \end{array}$.

Height 3.2—3.3, 3.8—4.2 in length with caudal. Head 3—3.2, 3.7—3.9 in length with caudal. Height of head 1.1—1.2 in its length. Eye 4.4—4.9, 1.5—1.9 in snout and 1—1.4 in nearly flat interorbital space. Mouth horizontal. Corner of mouth not quite reaching to below anterior nostril. Outer side of upper jaw superiorly with strong canines, the anterior ones directed forwards, the posterior ones flaring outwards and backwards. One transverse row of scales on cheek. Four scales before dorsal, the anterior one not larger than the others and situated immediately behind eye. Dorsal spines flexible, not pungent, the first equal to snout, the last nearly half diameter of eye longer and scarcely less than longest branched rays. First anal spine minute, third slightly shorter than snout, the longest branched anal rays equal to snout and half eye together. Pectorals and ventrals subequal, equal to snout and eye. Caudal slightly rounded. Colour of preserved specimens reddish brown, lighter below. Many scales of body and tail with dark spots. Some chalky white spots, more or less arranged in longitudinal rows, on head and body. Sometimes these spots assume the form of short stripes, specially on the sides of the head. Two light bands from eye and cheek downwards, running along the chin and continued in those of the other side, may be present. Dorsal with dusky spots, one or two large dusky blotches or transverse bands on membrane between first and second dorsal spines. Anal with or without dusky oblique bands. Caudal with dusky spots. Pectorals hyaline, with a pinkish hue and a pale brownish band along their base. Ventrals hyaline with a pinkish hue. Length 283 mm.

Nomen indig. Koko-Koko (Port Moresby).

Habitat: Java (Surabaja!); Borneo (Sandakan); Celebes (Makassar, Menado); Sula Islands!; Ternate; Buru; Ceram; Ambon; Banda; Timor; New Guinea (Port Moresby). — Coast of Natal, Zanzibar, Seychelles, Mauritius, Coasts of British India, Cocos Islands, China, Formosa, Philippines, Marshall Islands, Samoa, Tonga Islands, Rarotonga.

Note. This species differs from *L. vaigiensis* only in being somewhat more elongate, and in having teeth on the outer side of the upper jaw. There is no difference in colour as supposed by Bleeker.

2. **Cryptotomus** Cope

(Cope, Trans. American Phil. Soc. 1871, p. 462)

Calliodon Cuvier, Règne Animal, Ed. II, Vol. II, 1829, p. 266 (nec Gronovius, Bloch Schneider).
Callyodon Cuvier & Valenciennes, Hist. Nat. Poissons XIV, 1839, p. 285 (nec Gronovius, Bloch Schneider).
?*Calostomus* Gilbert, Proc. U. S. Nat. Mus. 1890, p. 70.
Leptoscarus Jordan, Genera of Fishes II, 1919, p. 199 (nec Swainson).

Elongate or oblong, compressed. Body covered with large scales. Head naked, with exception of a single transverse row of large scales on the cheek and a few rows of scales on opercle. Scales beginning above or behind posterior part of eyes with a very large median scale. Inner upper lip only developed laterally, not continued in middle and adnate to the outer lip. Dentition of the upper jaw consisting of a more or less coalesced series of small teeth along the cutting edge of the sides of the jaw, ending anteriorly before the symphysis and replaced by an outer row of more pointed teeth, covering the exterior side of the jaw, getting irregular towards the symphysis and more or less imbricate here. The interior side of the upper jaw with or without rather large conical teeth. An inner series of incisiviform teeth in the lower jaw, replaced at symphysis by an outer row of more pointed ones, in irregular series and more or less imbricate. Anterior nostril with a short tentacle. Scales of lateral line with arborescent tubes, running along the upper part of the sides of the body, and along the middle of the caudal peduncle, with an interruption or a simple bent downwards below end of dorsal and anal. Dorsal with IX flexible not pungent spines and 10 (11) branched rays. Anal with III flexible spines and 9 (10) soft rays. Caudal rounded, the upper lobe sometimes somewhat produced. Gillmembranes broadly attached to isthmus.

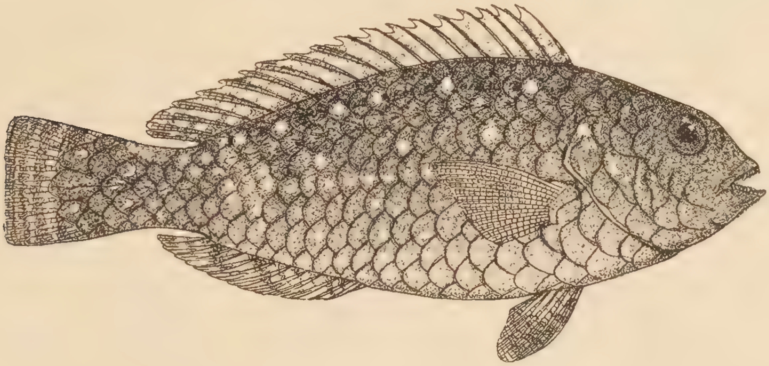

Fig. 39. *Cryptotomus spinidens* (Q. G.) × 2/3

Distribution: Tropical and subtropical parts of Indo-Pacific and Tropical West Atlantic.

Note. The name *Leptoscarus* Swainson has been used by several American authors for this genus, following Jordan, l.c., who wrote: "*Leptoscarus* Swainson, II, 226, haplotype *Scarus vaigiensis* Q. and G. = *Scarus spinidens* Cuv. = *Calliodon vaigiensis* Cuv. & Val.".

This is however a mistake. *Scarus vaigiensis* was described by Quoy & Gaimard (Voyage de l'Uranie et de la Physicienne, Zool. 1824, p. 288) after a specimen collected at Waigeu and also by Cuvier & Valenciennes (Hist. Nat. Poissons XIV, 1839, p. 214). Bleeker (Versl. Akad. Amsterdam XII, 1861, p. 243 and Atl. Ichth. I, 1862, p. 49) suggested that this species might be a *Scarichthys* and this was confirmed by Guichenot (Mém. Soc.

Imp. Sc. Nat. Cherbourg XI, 1865, p. 18) who re-examined the type. *Leptoscarus* Swainson has therefore to take the place of *Scarichthys*.

The reason why this mistake could be made is that Quoy & Gaimard described on the next page of their work cited above another fish from Waigeu as *Scarus spinidens*, which name was afterwards changed by Cuvier & Valenciennes (Hist. Nat. Poissons XIV, 1839, p. 296) into *Callyodon waigiensis*. Subsequent authors have mixed *Scarus vaigiensis* Q. G. and *Callyodon waigiensis* C. V. (= *Scarus spinidens* Q. G.). Günther probably started this series of mistakes as he added to the synonymy of *Callyodon spinidens* besides *Callyodon waigiensis* C. V., what is right, also "*Scarus vaigiensis*, pt. Q. G. and C. V." and amongst the synonymy of *Scarichthys auritus*: "*Scarus vaigiensis*, pt. Q. G. and C. V." appears again. I can not understand how Günther came to the opinion that Quoy & Gaimard mixed two species in their description of *Scarus vaigiensis*, as it is clear from what they say that it is based on a single specimen. However, once this mistake made, it went on and was even made worse by Fowler & Bean (Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 380) who say of *Scarus spinidens* Q. G.: "same type as *Scarus vaigiensis*".

1. **Cryptotomus spinidens** (Q. G.) (Fig. 39, p. 261)

Scarus spinidens Quoy & Gaimard, Voyage de l'Uranie et de la Physicienne, Zool. 1824, p. 289.
Scarus viridescens Rüppell, Neue Wirbelth. Fische 1835, p. 23.
Callyodon carolinus Cuvier & Valenciennes, Hist. Nat. Poissons XIV, 1839, p. 291.
Callyodon genistriatus Cuvier & Valenciennes, ibid. p. 293.
Callyodon waigiensis Cuvier & Valenciennes, ibid. p. 296.
Callyodon waigiensis? Bleeker, Nat. Tijdschr. Ned. Indië II, 1851, p. 256.
Callyodon genistriatus Bleeker, ibid. VI, 1854, p. 111.
Callyodon hypselosoma Bleeker, ibid. VIII, 1855, p. 425.
Callyodon carolinus Bleeker, ibid. XX, 1859—1860, p. 444.
Callyodon moluccensis Bleeker, Versl. Akad. Amsterdam XII, 1861, p. 243. — Atl. Ichth. I, 1862, p. 12.
Callyodon spinidens Bleeker, ibid. p. 244. — ibid. p. 13.
Callyodon genistriatus Bleeker, ibid. p. 244. — ibid. p. 13.
Callyodon carolinus Bleeker, ibid. p. 244. — ibid. p. 14.
Callyodon brachysoma Bleeker, ibid. p. 244. — ibid. p. 14.
Callyodon viridescens Günther, Cat. Brit. Mus. IV, 1862, p. 214.
Callyodon carolinus Günther, l.c.
Callyodon genistriatus Günther, ibid. p. 215.
Callyodon brachysoma Günther, l.c.
Callyodon spinidens Günther, l.c.
Callyodon moluccensis Günther, ibid. p. 216.

Callyodon carolinus Guichenot, Mém. Soc. Imp. Sc. Nat. Cherbourg XI, 1865, p. 61.
Callyodon genistriatus Guichenot, l.c.
Callyodon waigiensis Guichenot, ibid. p. 63.
Callyodon viridescens Günther, Fishes of Zanzibar 1866, p. 103.
Callyodon genistriatus Günther l.c.
Callyodon viridescens Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 558.
Callyodon viridescens Day, Fishes of India, Prt. 3, 1877, p. 410.
Calotomus snyderi Jenkins, Bull. Fish. Comm. XXII, (1902), 1904, p. 467.
Calotomus snyderi Jordan & Evermann, ibid. XXIII (1903), 1905, p. 342.
Calotomus moluccensis Jordan & Seale, Proc. U. S. Nat. Mus. XXVIII, 1905, p. 789.
Calotomus vaigiensis Jordan & Seale, l.c. (nec Q. G.).
Calotomus moluccensis Jordan & Richardson, Bull. Bur. Fish. XXVII, (1907), 1908, p. 268.
Callyodon genistriatus Günther, Fische der Südsee III, 1909, p. 300.
Callyodon moluccensis Günther, ibid. p. 302.
Callyodon snyderi Günther, l.c.
Callyodon vaigiensis M. Weber, Siboga Exp. Fische 1913, p. 383 (nec. Q. G.).
Callyodon brachysoma M. Weber, l.c.
Callyodon viridescens Barnard, Ann. S. Afric. Mus. XXI, 1925—1927, p. 776.
Leptoscarus moluccensis Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 377.
Leptoscarus viridescens Fowler & Bean, ibid. p. 378.
Leptoscarus vaigiensis Fowler & Bean, ibid. p. 380 (nec Q. G.).
Leptoscarus moluccensis Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 369.
Leptoscarus viridescens Fowler, ibidem, p. 370.
Leptoscarus carolinus Fowler, l.c.
Leptoscarus brachysoma Fowler, l.c.
Leptoscarus vaigiensis Fowler, ibid. p. 371 (nec Q. G.).
Leptoscarus viridescens Giltay, Mém. Mus. Roy. Hist. Nat. Belgique V, Fasc. 3, 1933, p. 79.

D. IX. 10 (11). A. III. 9 (10). P. 2. 11. V. I. 5. Ll. 24—25.
Ltr. $\begin{array}{c}1\frac{1}{2}\\\hline 1\\\hline 7\end{array}$.

Height 2.5—2.7, 3—3.6 in length with caudal. Head 3—3.3, 3.5—3.9 in length with caudal. Height of head 1—1.2 in its length. Eye 4.5—4.8, 1.5—1.7 in snout and equal to or somewhat less than slightly convex interorbital space. Mouth horizontal, its cleft reaching to below anterior nostril. Anteriorly in the upper jaw an outer row of rather large caninoid teeth, swollen at their base and with a more or less distinct cingulum, the posterior teeth of this row bent backwards. Posteriorly in the upper jaw an inner row of smaller teeth along the cutting edge, which is continued anteriorly as a toothless ridge, but not distinct in large specimens. The interior side of this ridge may have a short row of rather large conical teeth, or only a few teeth or no teeth at all. A single row of incisiviform teeth in the sides of the lower jaw, ending at some distance from symphysis where they are replaced by an outer row running obliquely upwards to symphysis and consisting of more pointed teeth. At symphysis the teeth are in two rows and more or less imbricate. Four scales between naked interorbital space and origin of dorsal. Dorsal spines flexible, the first as long as snout, the last half diameter of eye longer and as long as longest branched rays. First anal spine minute, third longest, longer than eye or as long as snout, slightly less than branched anal rays. Scaly sheath of dorsal and anal moderate. Pectorals rounded, equal to head without snout or somewhat longer. Ventrals as long as eye and snout together. Caudal rounded, the outer rays somewhat produced. Colour of preserved specimens reddish brown, lighter below, body and tail variegated with cloudy dark blotches. Two more rows of distant light spots along the back and sides may be present, as also smaller light spots scattered on side of head, sometimes united into bars radiating from eye. A deep violet band along base of pectoral may be present. Dorsal variegated with dusky, a black blotch on basal part of the membrane between first and second or second and third spine may be present. Anal uniform or variegated with brown, with or without a row of light dark edged ocelli along its base; distal part of anal sometimes dark. Caudal dusky or light reddish with narrow transverse wavy white lines. Pectorals and ventrals hyaline. Length 280 mm.

Habitat: Sumatra (Benkulen); Java (Batavia!); Borneo (Sandakan); Bali!; Celebes (Badjoa, Tombariri); Basa Island in Gulf of Boni; Saleyer!; Biaru!; Sangi Islands!; Ternate; Batjan; Ambon!; Nusa Laut!; Buru; Ceram; Banda; Rotti!; Timor; Kei Islands!; Waigeu; New Guinea (Hood Bay). — Coast of Natal, Zanzibar, Red Sea, Mauritius, Seychelles, Coasts of British India, Andamans, Formosa, Philippines!, Carolines, New Hebrides, Tahiti, Hawaii, Laysan. In sea.

Note. Bleeker divided the Indo-australian species of this genus in two groups: one with and the other without teeth on the interior side of the premaxillary. Günther (1866 and 1909, l.c.) was of opinion that these inner teeth are only present in the young and disappear with age. However I have seen young as well as adult specimens with and without these teeth, but I do not think their presence or absence is of any specific value. M. Weber has already united the two species of Bleeker's first group. In the second group Bleeker placed *genistriatus, carolinus* and *brachysoma,* distinguishing the first from the two others by having red bands between the eye and the maxillary. I find among the specimens, which according to their dentition belong to the first group as also among those of the second group specimens with these bands, others with spots, and still others where the spots are partly confluent into bands. The difference between *carolinus* and *brachysoma* is according to Bleeker to be found in the height of the scaly dorsal sheath. I find however that the scales of the sheath are movable, and raise with the fin, as has already been remarked by Klunzinger in describing *viridescens* l.c.: "Die Schuppen an der Rücken- und Afterflosse bedecken, je nachdem sie aufgerichtet sind, einen grösseren oder kleineren Theil der Flosse". Bleeker also distinguishes his species by the depth of the body but I find a good deal of variation in slenderness between specimens which certainly belong to the same species.

3. **Callyodon** (Gronovius) Bloch Schneider

(Gronovius, Mus. Ichth. II, 1764, p. 8. — Bloch Schneider, Syst. Ichth. 1802, p. 312)

Pseudoscarus Bleeker, Versl. Akad. Amsterdam XII, 1861, p. 230.

Elongate, compressed. Body covered with large scales. Head naked, with exception of two to three transverse rows of scales on the cheek. Inferior preopercular limb below these scales either naked or with one row of scales, sometimes consisting of one or two scales only. Scales beginning on upper side of head behind eye. Inner upper lip developed at sides only, sometimes rudimentary. Teeth in jaws fully coalesced, forming a broad convex

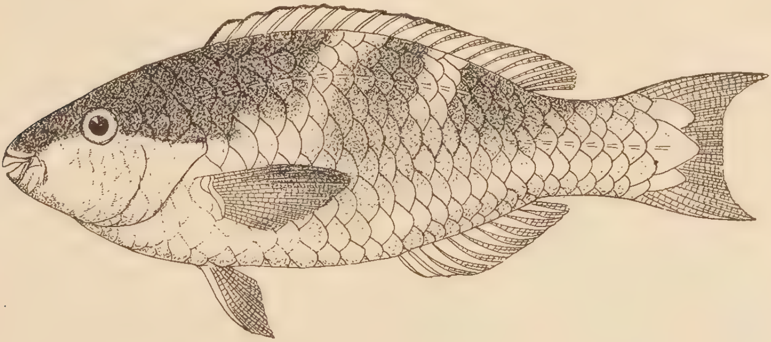

Fig. 40. *Callyodon oviceps* (C. V.). × ½.

cutting lamina, in which individual teeth cannot be distinguished as a rule. Canines may be present posteriorly in the upper and lower jaw. Anterior nostril generally with a low rim, but as a rule without tentacle. Scales of lateral line with more or less arborescent tubes. Lateral line interrupted or with a bent downwards posteriorly. Dorsal with IX flexible spines and 10 (11) soft rays. Caudal rounded, truncate or emarginate, the lobes often produced. Gill-membranes more or less attached to isthmus.

Distribution. Tropical coasts of Atlantic, Indic and Pacific, but not known from the Pacific Coast of America. Living in shoals, often consisting of different species, on and along coral reefs.

Note. The identification of preserved specimens of this genus is notoriously difficult, as many species mainly differ in colour, which generally fades away soon after preservation. Among the characteristics used by Bleeker to distinguish between the species I have found the most valuable: the squamation of the cheek and the presence or absence of scales on the inferior preopercular limb. The number of branched pectoral rays seems also to be very constant. A good help is also the colour of the teeth, which can either be green or blue, or white, pinkish or light brownish. Only among the species with two rows of scales on the cheek and a naked inferior preopercular limb the differences in colour between the species with yellowish green and yellowish brown teeth is not very striking. Other characteristics mentioned by Bleeker, appear to be of less importance. Bleeker's main division of the spieces is based on the development of the lips. He distinguished between species with narrow lips, covering only the base of the dental plates, and species with broad lips which cover the teeth entirely or for the greater part. In several cases however the lips are well developed in the young but lack behind in growth so that the teeth remain uncovered in large specimens. Preservation may also make the lips shrimp, so that this characteristic has to be used with some care. The same can be said of the development of the inner upper lip, although there are certainly species in which this lip is constantly rudimentary and others where it is well developed. The size of the nostrils depends according to my experience greatly on the mode of preservation and is of no great importance. The presence or absence of posterior canines may be of some value, but as far as my experience goes at least in some species they may be absent in young ones and develop in later stages.

Key to the Indô-australian species of Callyodon

I. Three rows of scales on cheek, and one or two scales on inferior preopercular limb . . . . 1. *C. bicolor* p. 272.

II. Three rows of scales on cheek, the inferior preopercular limb naked.
  a. Teeth blue or green. Lips narrow. P. 2.14.
    a^1. Profile of head between eye and mouth convex.
      a^2. A straight band from corner of mouth to subopercle or to base of P. . . . . 2. *C. microrhinus* p. 273.
      b^2. A curved band from corner of mouth to lower border of eye and beyond. Similar bands radiate from eye. . . . . . 3. *C. strongylocephalus* p. 274.
    b^1. Profile of head straight. Head without bands . . . . 4. *C. microcheilus* p. 275.
  b. Teeth white. Lips broad. P. 2.12—13.
    a^1. P. 2.13. Dental plate smooth. A band from rictus backwards, similar bands radiating from hindborder of eye, not always visible in preserved specimens . . . . 5. *C. harid* p. 276.
    b^1. P. 2.12. Dental plate rugose. Head and anterior part of body spotted. 6. *C. pulchellus* p. 277.
    c^1. P. 2.12. Two light patches on the side. A dark patch covering head and back from mouth to near extremity of P. . . . . 7. *C. zonatus* p. 278.
    d^1. Black ocellus on third-sixth dorsal spines. Black band from nape to base of pectoral. Black stripe through eye downward . . . . . 8. *C. ophthalmistius* p. 279.

III. Two rows of scales on cheek. A third row, sometimes consisting of one scale only, on inferior preopercular limb.
  a. Teeth green or blue.
    a^1. Upper profile of head not abruptly bent downwards before eye.
      a^2. Lips broad, covering greater part of dental plate.
        a^3. Dorsal spines slightly increasing in length posteriorly. Tail with light spots. P. 2.13.
          a^4. Dorsal and anal uniform. 9. *C. singaporensis* p. 280.
          b^4. Dorsal and anal with longitudinal bands . . . 10. *C. janthochir* p. 281.

b^3. Dorsal spines subequal. Tail without spots, lighter than body. P. 2.12. Sides of head and thorax lighter than upper part of head and back. . . . 11. *C. vermiculatus* p. 282.

b^2. Lips narrow, covering only small part of dental plate.

a^1. Height 2.6—2.7. Dark brown. Generally bands above upper lip and below lower lip and from rictus to eye. Generally a light spot or stripe on temporal region. Fins dark, often with a light edge. P. 2.12. . 12. *C. nuchipunctatus* p. 283.

b^1. Height 2.8—3.1. Profile of head with a slight concavity before eyes. P. 2.13. . . . 13. *C. xanthopleura* p. 285.

c^2. Lips rather narrow. Teeth very dark green. P. 2.12. Upper part of head and back generally darker than sides of head and anterior part of body. A broader or narrower band from rictus to lower border of eye and beyond. Caudal lobes much produced. . 14. *C. pectoralis* p. 286.

b^1. Upper profile of head abruptly bent downwards before eye. Height 2.6. P. 2.13. Lower lip rather narrow. 15. *C. macleayi* p. 288.

b. Teeth white, yellowish, or pinkish.

a^1. Uniform brown, no bands on fins. P. 2.14. Upper profile of head gibbous. Dental plates rough. No canines. Young with white spots on body . . . . 16. *C. muricatus* p. 288.

b^1. Head, body, and fins generally with some markings. P. 2.11—13.

a^2. Head and anterior half of body and posterior half of body and tail of a different colour.

a^3. Dorsal spines subequal, the first about twice eye. Light anteriorly, dark posteriorly. 17. *C. dimidiatus* p. 289.

b^3. Dorsal spines decreasing in length posteriorly, the first as long as snout. Dark anteriorly, light posteriorly . 18. *C. frenatus* p. 290.

b^2. No sharp difference between colour of anterior and of posterior part of body.

a^3. Dorsal spines decreasing in length posteriorly, the first as long as snout. Four to five scales before dorsal. Nostrils minute. P. 2.11—12.

a^4. Dorsal with a median band. A yellow elongate patch from eye to below P. Anal dark with a broad light edge . . . . . . 19. *C. javanicus* p. 292.

b^4. Dorsal without band. Anal light with a dark patch anteriorly . . . . 20. *C. hypselopterus* p. 293.

b^3. Dorsal spines subequal.

a^4. A broad dark band from eye to caudal. P. 2.12.

a^5. Profile of head convex. D. light. . . . . 21. *C. forsteni* p. 294.

b^5. Profile of head concave. D. dark. . . . 22. *C. tricolor* p. 295.

b^4. No dark longitudinal band.

a^5. Lips narrow or broad. P. 2.13. Generally dark markings on scales of body and tail . . . . 23. *C. rubroviolaceus* p. 296.

b^5. Lips narrow. P. 2.12.

a^6. Head gibbous. Green band from rictus to eye . . . . . . 24. *C. verweyi* p. 298.

b^6. Uniform, no bands on head or markings on scales . . . . 25. *C. papuensis* p. 299.

c^5. Lips broad.

a^6. Head without bands.

a^7. Body dark, caudal peduncle and C. lighter . . . 26. *C. viridibusius* p. 299.

b^7. Top of head brownish, rest green. Body green and magenta . . 27. *C. moresbyensis* p. 300.

c^7. Narrow light longitudinal bands on belly. Head uniform. P. 2.12 . . . . 28. *C. dubius* 1) p. 300.

d^7. More or less distinct broad transverse light bands

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1) Light bands on belly may also occur in other species, f.i. in *C. ghobban*, which species may be distinguished by having P. 2.13 in cases where the bands on the head are obsolete. *C. hypselopterus* also sometimes shows light bands on the belly, but may be distinguished by its much higher dorsal fin.

on posterior part of body. Head often dark above, light below. Narrow light longitudinal bands on belly may be present. P. 2.12 (13) . . . . . 29. *C. oviceps* p. 302.

e^7. Head, back and spinous D. dark, rest light. P. 2.13. 30. *C. macrocheilus* p. 303.

b^6. Head with bands.

a^7. Greyish bands and spots on head, which generally disappear in preserved specimens. A light band on chin is visible in most cases. Dorsal often with a row of dark spots. P. 2.13 . . . . 31. *C. ghobban* p. 304.

b^7. Greyish or yellowish anastomosing and meandering bands on head. P. 2.12 (13). 32. *C. fasciatus* p. 306.

c^7. Profile of head slightly concave. A band from eye to snout and another from corner of mouth to eye. Pectorals 2.12 and with a median longitudinal band . . . 33. *C. dussumieri* p. 308.

d^7. Profile of head very convex. A light band from corner of mouth to eye, spreading more or less patch like on cheek. Pectorals with a median longitudinal band and 2.12 (13) . 34. *C. blochi* p. 309.

IV. Two rows of scales on cheek, preopercular limb naked. (In some specimens of species belonging to group III which have only one scale on preopercular limb, this scale may be absent. Consult therefore both groups in doubtful cases).

a. Teeth yellowish green.

a^1. Lips narrow.

a^2. P. 2.13, generally variegated darker and lighter. Dental plate crenulated . . . . 35. *C. sordidus* p. 311.

b^2. P. 2.12. Body with series of light blotches . . . . 36. *C. margaritus* p. 313.

b^1. Lips broad. P. 2.12. . . . . 37. *C. oktodon* p. 314.

b. Teeth white or pinkish, but without green tinge.

a^1. Lips narrow. P. 2.13.

a^2. No bands from rictus to eye. Body with transverse bands . . 38. *C. rhoduropterus* p. 315.

b^2. No bands from rictus to eye. Body uniform.

a^3. Band along lower lip. Dorsal with a median band. Dark blotch at base of P. . . . 39. *C. cyanotaenia* p. 316.

b^3. Band along upper and lower lip or no bands at all. Dorsal without median band . . . 40. *C. erythrodon* p. 316.

c^3. A band from rictus to operculum and another from rictus to base of pectoral, which is variegated with yellow. Profile of head before eyes convex. Upper lip very short . . . . 41. *C. bleekeri* p. 318.

d^3. A band from rictus to eye. One or two bands over interorbital space. Dorsal with longitudinal band. Profile of head before eyes convex. Lips very short . . 42. *C. bowersi* p. 319.

b^1. Lips broad. P. 2.12.

a^2. Body with broad transverse bands . . . . 43. *C. mutabilis* p. 320.

b^2. Body without transverse bands. A dark spot in axil of pectoral.

a^3. Inner upper lip well developed. No bands on head or on caudal . . . . 44. *C. moensi* p. 322.

b^3. Inner upper lip well developed. Bands along lips and from rictus to eye. Caudal with the lobes produced and with transverse bands. Dorsal and anal with a distinct edge, bordered by a dark line . . 45. *C. bataviensis* p. 323.

c^3. Inner upper lip poorly developed. Caudal rounded, lobes scarcely produced and light basally, darker distally . . . 46. *C. forsteri* p. 325.

1. **Callyodon bicolor** (Rüpp.)

Scarus bicolor Rüppell, Atlas Reise N. Afrika, Fische 1828, p. 82.
Pseudoscarus bicolor Bleeker, Versl. Akad. Amsterdam XII, 1861. p. 82. — Atl. Ichth. I, 1862, p. 33.
Pseudoscarus bicolor Günther, Cat. Brit. Mus. IV, 1862, p. 219.
Pseudoscarus bicolor Guichenot, Mém. Soc. Imp. Sc. Nat. Cherbourg XI, 1865, p. 53.
Pseudoscarus pulchellus var(?). *bicolor* Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 560.
Pseudoscarus bicolor Günther, Fische der Südsee III, 1909, p. 305.
Callyodon bicolor Snyder, Proc. U. S. Nat. Mus. XLII, 1912, p. 509.
Pseudoscarus bicolor M. Weber, Siboga Exp. Fische 1913, p. 384 (sine syn.).
Callyodon bicolor Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 496.
Callyodon bicolor Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 388.

D. IX. 10 (11). A. III. 9. P. 2. 12 (13). V. I. 5. Ll. 18 + 6—7. Ltr. $\begin{array}{c}1\frac{1}{2}\\ \hline 1\\ \hline 7\end{array}$.

Height 2.7—3, 3.4—3.5 in length with caudal. Head 2.8—3.2, 3.5—3.7 in length with caudal. Height of head 1.1—1.2 in its length. Eye 4.9—8.6, 2.3—4.3 in snout and 1.4—2.5 in slightly convex interorbital space. Inner upper lip short, its connection with outer lip much nearer to corner of mouth than to symphysis of upper jaw. Nostrils close together, the anterior with a rim, which is produced into a rounded filament posteriorly. Posterior nostril oval, larger than anterior one. Dental plate white, rugose, the teeth showing plainly as rows of white granules. Three transverse rows of scales on cheek, leaving a broad inferior preopercular limb naked, excepting one or two scales near its posterior edge. Six scales before dorsal. Dorsal spines subequal, about equal to distance between corner of mouth and eye. Soft dorsal rays of equal height, the posterior ones only somewhat longer, the fin being pointed behind. Anal similar to dorsal. Pectorals equal to head without snout. Ventrals half diameter of eye longer than snout. Caudal truncate or slightly rounded in young, slightly emarginate with the lobes produced in old specimens. Colour of preserved specimens yellowish or reddish. The scales of body and tail below lateral line with a vertical brown bar, sometimes also with brown spots. Thorax and lower half of head also spotted with brown, sometimes forming horizontal rows on preopercular limb. Longitudinal stripes and irregular spots and curved lines behind eye on opercle. In young ones sometimes a vertical dark brown narrow band from origin of pectoral over opercle to base of dorsal, where it is connected with that of the other side. A similar band may connect eyes over interorbital space and another band may run from anterior part of lower edge of eye to chin. Dorsal yellowish, with a diffuse dark blotch on third to ninth dorsal spines, more pronounced in young and sometimes forming an almost black white edged ocellus. Anal uniform yellowish or reddish with a light edge. Caudal yellowish or reddish, often with darker spots. Pectorals yellowish or hyaline. Ventrals violet at base, lighter distally, or the membranes only are violet and the rays light. Length 363 mm.

Habitat: Celebes (Makassar!, Badjoa). — Red Sea, Riu Kiu Islands, Philippines!, Ponapé, Funafuti, Society Islands. In sea.

2. **Callyodon microrhinus** (Blkr.)

?*Scarus cretensis* Bloch, Ausländ. Fische IV, 1790, p. 23 (nec *Labrus cretensis* L.).
?*Scarus striatus* Cuvier & Valenciennes, Hist. Nat. Poissons XIV, 1839, p. 209.
Scarus microrhinos Bleeker, Nat. Tijdschr. Ned. Indië VI, 1854, p. 200.
Pseudoscarus microrhinos Bleeker, Versl. Akad. Amsterdam XII, 1861, p. 231. — Atl. Ichth. I, 1862, p. 22.
Pseudoscarus microrhinus Günther, Cat. Brit. Mus. IV, 1862, p. 235.
?*Pseudoscarus striatus* Guichenot, Mém. Soc. Imp. Sc. Nat. Cherbourg XI, 1865, p. 30.
Pseudoscarus striatus Sauvage, Poissons de Madagascar 1891, p. 467.
Callyodon ultramarinus Jordan & Seale, Occas. Papers B. P. Bishop Mus. IV, 1906, p. 63. — Bull. Bur. Fish. XXV (1905), 1906, p. 332.
Pseudoscarus microrhinus Günther, Fische der Südsee III, 1909, p. 322.
Callyodon microrhinos Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 418.
Callyodon microrhinos Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 378. — Acad. Nat. Sc. Philadelphia, Monogr. 2, 1938, p. 113, p. 177.

D. IX. 10 (11). A. III. 9 (10). P. 2. 14. V. I. 5. Ll. 19 + 6—9. Ltr. $\begin{array}{c} 1\frac{1}{2} \\ \hline 1 \\ \hline 6\text{—}7 \end{array}$.

Profile of head with a slight hump in large specimens. Height 2.6—2.9, 3.2—3.5 in length with caudal. Head 2.7—2.9, 3.3—3.5 in length with caudal. Eye 7.4—8.4, 3.8 in snout and 2.5—2.7 in convex slightly keeled interorbital space. Lips narrow, greater part of dental plate, which is green, uncovered. A posterior canine in the upper jaw present. Inner upper lip very short, its connection with the outer lip much nearer to rictus than to symphysis of upper jaw. Anterior nostril rounded with a low brim. Posterior nostril more or less oval without rim. Three rows of scales on cheek, leaving a broad inferior preopercular limb naked. Four scales before dorsal. Dorsal spines subequal, as long as or a little shorter than distance between rictus and eye. Third anal spine about twice eye. Soft anal slightly deeper than soft dorsal, somewhat pointed behind. Pectorals half diameter of eye shorter than head. Ventrals equal to snout and eye. Caudal slightly emarginate, the lobes produced and more or less crescentic. Colour of preserved specimens reddish brown, centre of scales of body and tail carmin red. Lips with yellow bands, that of the lower lip continued in horizontal direction to end of opercle, opposite base of pectoral. Dorsal vinous red, with a light edge. Anal similar, sometimes with a yellow median band. Basal part and lobes of caudal reddish, distal part yellowish. Upper rays of pectorals yellowish, following rays reddish, the inferior rays only reddish in their basal part and bluish hyaline distally. Ventral spine and first ray yellowish, the membranes of the other rays sometimes pinkish or bluish hyaline. Length 515 mm.

Habitat: Java (Batavia); Celebes (Makassar); Biwang Unang Island; Adonare!; New Guinea (Moresby Bay). — Madagascar, Mauritius, Philippines!, Fiji, Samoa, Society Islands, Gambier Islands. In sea.

3. **Callyodon strongylocephalus** (Blkr.)

Scarus strongylocephalus Bleeker, Nat. Tijdschr. Ned. Indië VII, 1854, p. 439.

Pseudoscarus strongylocephalus Bleeker, Versl. Akad. Amsterdam XII, 1861, p. 231. — Atl. Ichth. I, 1862, p. 23.

Pseudoscarus strongylocephalus Günther, Ann. Mag. Nat. Hist. (4) XII, 1873, p. 182.

Pseudoscarus strongylocephalus Sauvage, Poissons de Madagascar 1891, p. 466.

?*Scarus pinguirostratus* Fowler, Journ. Acad. Nat. Sc. Philadelphia (2) XII, Prt. 4, 1904, p. 541.

Callyodon strongylocephalus Seale, Occas. Papers B. P. Bishop Mus. X, 1928, p. 378.

D. IX. 10 (11). A. III. 9. P. 2. 14. V. I. 5. Ll. 19 + 6. Ltr. $\begin{array}{c}1\frac{1}{2}\\ \hline 1\\ \hline 5-6\end{array}$.

Height 2.7—2.9, 3.3—3.6 in length with caudal. Head 2.7—2.8, 3.3—3.5 in length with caudal. Height of head 1.1 in its length. Eye 5.8—7.1, 2.5—3.2 in snout and 1.9—2.5 in convex interorbital space. Lips narrow. Inner upper lip short, its connection with outer lip much nearer to rictus than to symphysis of upper jaw. Nostrils minute. Teeth dirty greenish. No canines at corner of mouth. Cheek with three rows of scales, the inferior preopercular limb naked. Four scales before dorsal. Dorsal spines and rays subequal, about equal to distance between pupil and corner of mouth. Soft anal similar to soft dorsal. Pectorals about half length of snout shorter than head. Ventrals half diameter of eye longer than postorbital part of head. Caudal rounded, the lobes scarcely produced in young, well produced in adults. Colour of preserved specimens reddish brown, slightly lighter below. Upper lip and a band behind lower lip creamy, followed by a second less distinct one. Dorsal light greyish, with a dark brown subterminal narrow edge and a broad median brown band, somewhat interrupted into a row of spots posteriorly. This band not always distinct. Anal greyish with a subterminal edge and a median greenish band. Pectorals hyaline with an oblique brown band from base of posterior rays to tip of anterior ones, which is not always distinct. Caudal greyish blue in its basal half, brown with irregular greyish blue blotches in its distal part, sometimes with a dark posterior edge. Length 460 mm.

Habitat: Sumatra? (Padang?); Java (Batavia!); New Guinea (Port Moresby). — Zanzibar, Mauritius, Philippines!, Tahiti. In sea.

4. **Callyodon microcheilus** (Blkr.)

?*Scarus capistratus* Cuvier & Valenciennes, Hist. Nat. Poissons XIV, 1839, p. 239.

Scarus capistratus Bleeker, Nat. Tijdschr. Ned. Indië IV, 1853, p. 497 (nec C. V.?).

Pseudoscarus microcheilos Bleeker, Versl. Akad. Amsterdam XII, 1861, p. 231. — Atl. Ichth. I, 1862, p. 24.

Pseudoscarus microcheilus Günther, Cat. Brit. Mus. IV, 1862, p. 236.

Callyodon microcheilos Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 417.

D. IX. 10 (11) (X. 9 (10) in the type). A. III. 9. P. 2. 14. V. I. 5. Ll. 17—18 + 6. Ltr. $\begin{array}{c}1\frac{1}{2}\\ \hline 1\\ \hline 6\end{array}$.

Height about 2.8, 3.4 in length with caudal. Head with the upper profile sloping down almost in a straight line, 3.2, 3.7 in length with caudal. Height of head 1.1 in its length. Eye 5.8, 2.5 in snout and almost twice in interorbital space. Lips short, leaving greater part of dental plate uncovered. Inner upper lip poorly developed. Teeth greenish blue. A posterior canine may be present. Nostrils small. Scales on cheek in three rows, the inferior preopercular limb naked. Dorsal spines and rays subequal, about as long as distance between eye and corner of mouth. In the type specimen the first dorsal ray is abnormally developed as a spine. Anal similar to dorsal. Pectorals about half length of snout shorter than head. Ventrals about equal to postorbital part of head. Caudal emarginate, the lobes pointed. Brown or greenish, the scales of the body with a reddish edge. No bands on head. Lips red. Dorsal and anal pinkish with a broad blue edge and a median green band, broken into rows of spots by the spines and rays. Caudal pink basally, green distally, the lobes blue. Pectorals and ventrals brown or reddish, the anterior edge blue. Length 300 mm. (After Bleeker, not seen by me.)

Habitat: Java (Batavia); Binang Unang Island. — Philippines, Samoa, Society Islands, Paumotu Islands. In sea.

5. **Callyodon harid** (Forsk.)

Scarus harid Forskål, Descript. Animalium 1775, p. 30.
Scarus mastax Rüppell, Atlas Reise N. Afrika, Fische 1828, p. 80.
Scarus longiceps Cuvier & Valenciennes, Hist. Nat. Poissons XIV, 1839, p. 241.
Scarus latus Cuvier & Valenciennes, ibid. p. 245.
Scarus mastax Cuvier & Valenciennes, ibid. p. 246.
Scarus Ruppelii Cuvier & Valenciennes, ibid. p. 259.
Scarus mastax Bleeker, Nat. Tijdschr. Ned. Indië VI, 1854, p. 199.
Pseudoscarus mastax Bleeker, Versl. Akad. Amsterdam XII, 1861, p. 236. — Atl. Ichth. I, 1862, p. 35.
Pseudoscarus longiceps Bleeker, Atl. Ichth. I, 1862, p. 50.
Pseudoscarus harid Günther, Cat. Brit. Mus. IV, 1862, p. 220.
Pseudoscarus longiceps Guichenot, Mém. Soc. Imp. Sc. Nat. Cherbourg XI, 1865, p. 42.
Pseudoscarus mastax Guichenot, ibid. p. 44.
Pseudoscarus harid Guichenot, ibid. p. 45.
Pseudoscarus harid Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 561.
Pseudoscarus harid var. *mastax* Klunzinger, ibid. p. 562.
Pseudoscarus harid Day, Fishes of India, Prt. 3, 1877, p. 411.
Pseudoscarus harid Günther, Fische der Südsee III, 1909, p. 306.
Pseudoscarus harid M. Weber, Siboga Exp. Fische 1913, p. 385.
Callyodon harid Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 420.
Callyodon harid Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 379. — Acad. Nat. Sc. Philadelphia, Monogr. 2, 1938, p. 130.

D. IX. 10 (11). A. III. 9—10. P. 2. 13. V. I. 5. Ll. 17 + 9. Ltr. $\begin{array}{c}1\frac{1}{2}\\ \hline 1\\ \hline 7\end{array}$.

Height 2.5—2.6, 3.1—3.2 in length with caudal. Head 2.7—3.1, 3.3—3.9 in length with caudal. Height of head 1.1 in its length. Eye 6.8—7.7, 3.4—4.1 in snout and 1.7—2.1 in flat interorbital space. Lips broad. Inner upper lip well developed, coalesced with outer lip at a point nearer to corner of mouth than to symphysis of upper jaw, but anteriorly to this point a furrow which ends at a short distance of symphysis indicates the line of concrescence of inner and outer lips. Nostrils minute, almost imperceptible. Dental plate white or yellowish, smooth. Posterior canines may be present. Three transverse rows of scales on cheek, leaving superiorly a broad suborbital region and inferiorly a broad preopercular limb, naked. Five or six scales before dorsal. Dorsal spines subequal, a little less than postorbital part of head. Soft dorsal slightly lower than spinous part. Third anal spine as long as dorsal spines. Soft anal similar to soft dorsal, pointed behind. Pectorals equal to their distance from corner of mouth. Ventrals slightly less than snout and eye together. Caudal truncate, the lobes curved, produced or much produced. Colour of preserved specimens pale brown, the scales with a broad darker edge. Fins uniform yellowish, dorsal and anal with a more or less distinct dark edge. In life a band from corner of mouth to pectoral and bands radiating from eye. Length 521 mm.

Habitat: Java (Batavia); Binongka!; Ternate; Kei Islands!; Waigeu; New Guinea. — Madagascar, Zanzibar, Mauritius, Red Sea, Seychelles, Coasts of British India, Cocos Islands, Philippines!, Pelew Islands, Ponapé, Ruk, Samoa, Paumotu Islands. In sea.

6. **Callyodon pulchellus** (Rüpp.)

Scarus pulchellus Rüppell, Neue Wirbelth. Fische 1835, p. 25.
Scarus pulchellus Bleeker, Nat. Tijdschr. Ned. Indië VII, 1854, p. 440.
Pseudoscarus pulchellus Bleeker, Versl. Akad. Amsterdam XII, 1861, p. 236. — Atl. Ichth. I, 1862, p. 34.
Pseudoscarus pulchellus Günther, Cat. Brit. Mus. IV, 1862, p. 219.
Pseudoscarus pulchellus Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 559.
Pseudoscarus pulchellus Günther, Fische der Südsee III, 1909, p. 305.
Scarus pulchellus Kendall & Goldsborough, Mem. Mus. Comp. Zool. XXVI, N° 7, 1911, p. 305.

Callyodon pulchellus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 423.
Callyodon pulchellus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 379.

D. IX. 10 (11). A. III. 9. P. 2. 12. V. I. 5. Ll. 16 + 7. Ltr. $\begin{array}{c}1\frac{1}{2}\\ \hline 1\\ \hline 7\end{array}$.

Height 2.7, 3.3 in length with caudal. Head rather pointed, profile of snout rounded. Head 2.7, 3.3 in length with caudal. Height of head 1.1—1.2 in its length. Eye 7—8.1, 3.9—4.3 in snout and 1.8—1.9 in almost flat interorbital space. Lips broad, covering dental plate almost entirely. Inner upper lip poorly developed, its connection with outer lip nearer to rictus than to symphysis of upper jaw. Dental plate white, rugose, the individual teeth distinct and forming a crenulated edge. Anterior nostril small with a low rim, posterior nostril a large oval opening. Scales on cheek in three rows, the inferior preopercular limb naked. Three scales before dorsal. Anterior dorsal spines somewhat shorter than posterior ones and than rays, which are about equal to distance between hindborder of eye and posterior nostril. Anal about as deep as dorsal. Pectorals slightly longer than snout. Ventrals equal to postorbital part of head. Caudal slightly emarginate, the lobes produced. Colour of preserved specimens reddish, chin and throat pinkish. Upper lip pinkish. A band of the same colour from corner of mouth to base of pectoral. Sides of head and anterior part of body with many round pinkish spots, less crowded on snout. Pinkish bands radiating from eye. Interorbital space and nape with sinuous short bands and curved stripes. Dorsal reddish. A pinkish oval or elongate stripe like spot at base and along each spine and ray. Anal pinkish basally, darker terminally, the two colours rather sharply defined. Base of caudal pinkish, followed by a curved transverse darker band. Base of lobes of caudal with oval darker spots or ocelli. Pectorals violet. Ventrals pinkish. Length over 600 mm.

Habitat: Java (Batavia!); Lesser Sunda Islands!; Celebes (Menado); Limbe Strait. — Mauritius, Red Sea, China, Philippines!, Pelew Islands, New Britain, Ponapé, Funafuti, Paumotu Islands. In sea.

7. **Callyodon zonatus** (Macl.)

Pseudoscarus zonatus Macleay, Proc. Linn. Soc. New S. Wales VII, 1882, p. 591.

"Three series of scales on the cheek, not covering the praeopercular limb; the jaws are whitish, without teeth at the angle, the upper almost entirely covered by the lip; thirteen pectoral rays; tail crescentic, the outer rays considerably produced. The lower profile is much more convex than the upper. Coloration according to Mr. Goldie: "Head dull green fading to light green towards the tail, two yellow patches on each side, pinkish along belly. There seems to be a well defined dark patch covering the head and back from the mouth to near the extremity of pectoral fin in a line with the lower margin of the eye" ". (After Macleay, not seen by me.)

Habitat: New Guinea (Moresby Bay).

Note. Fowler & Bean (Bull. U. S. Nat. Mus. 100. Vol. VII. 1928, p. 452) have united this species with *C. oviceps* (C. V.). As Macleay states, that there are 3 rows of scales on the cheek, and that the preopercular limb is naked, it cannot be this species.

8. **Callyodon ophthalmistius** (Herre)

Scarus ophthalmistius Herre, Copeia 1933, p. 21.

D. IX. 10. A. III. 9. P. ?. Ll. 17 + 6. Ltr. $\begin{array}{c}1\\\hline 1\\\hline 6\end{array}$.

The depth equals the head and is contained 2.85 times in the length; the snout is 2.33, the eye 5 to 5.4, the interorbital 3.5, the least depth of the caudal peduncle 2.2—2.3 times in the head. Dorsal profile sloping gently in a straight line to above eyes, then more steeply descending to the tip of the elongate snout. There are 3 rows of scales on the cheek, none on the preopercular flange. Dorsal highest anteriorly, the third spine 2.45—2.66, the ninth spine 2.9, the first ray 2.8—2.85, the eighth ray 2.35—2.5 in head. Third anal spine 4—5, the first anal ray 3, the eighth ray 2.7—3 in head. The lips cover the basal half of the white teeth; there are no canines. Colour in alcohol warm reddish brown, each scale below the lateral line with a black vertical basal bar; there is a broad band over the nape and down the posterior margin of the opercle to the level of the pectoral base; a black interocular stripe continues below eye diagonally forward and downward behind the mouth and across the throat, uniting with its fellow from the other side; the dorsal is dusky gray with a large black ocellus extending from the third to the sixth spines; on one specimen there is a black line below the ocellus and a black marginal line above; the caudal is dusky basally, its posterior half orange red; the other fins are all very pale reddish. Length 143 mm. (After Herre, not seen by me.)

Habitat: Sulu Islands.

9. **Callyodon singaporensis** (Blkr.)

Scarus singaporensis Bleeker, Nat. Tijdschr. Ned. Indië III (1851) 1852, p. 69.
Pseudoscarus singapurensis Bleeker, Versl. Akad. Amsterdam XII, 1861, p. 235. — Atl. Ichth. I, 1862, p. 31.
Pseudoscarus singaporensis Günther, Cat. Brit. Mus. IV, 1862, p. 235. — Fische der Südsee III, 1909, p. 325.
Callyodon guttatus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 493 (nec Bl. Schn.).
?*Callyodon guttatus* Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 388 (nec Bl. Schn.).

D. IX. 10 (11). A. III. 9. P. 2. 13. V. I. 5. Ll. 25. Ltr. $\begin{array}{c}1\frac{1}{2}\\ \hline 1\\ \hline 6\end{array}$.

Height 2.8, 3.6 in length with caudal. Head 3, 3.7 in length with caudal. Height of head 1.1 or 1.2 in its length. Eye 6.7, 2.5 in snout and 1.7—2 in interorbital space. Nostrils minute. Lips broad, covering greater part of dental plate. Inner upper lip well developed, its connection with the outer lip nearer to corner of mouth than to symphysis of upper jaw. Teeth greenish blue. No posterior canines. Two rows of scales on cheek and a third on inferior preopercular limb. First dorsal spine slightly more than distance between rictus and eye, following spines slightly increasing in size. Dorsal rays somewhat longer than spines. Anal slightly deeper than dorsal. Pectorals half length of snout shorter than head. Ventrals equal to postorbital part of head. Caudal slightly rounded, the lobes somewhat produced. Body greenish violaceus or brown; forehead and cheek more or less pink in older specimens. Lips red. A green gently undulated band running from chin and behind the corner of the mouth to the lower border of the eye. Scales of the back and sides partly with one to three white or pink spots. Soft part of dorsal and caudal often with brown spots. Pectorals and ventrals uniform. Length 355 mm. (After Bleeker, not seen by me.)

Habitat: Singapore; Java (Batavia); Tidore. — Philippines, Ponapé, Samoa, Funafuti. In sea.

Note. Fowler & Bean l.c. have united *singaporensis* with *C. guttatus* (Lac.). This lastnamed species however, as described by several authors under that name or as *maculosus*, has white teeth and seems to have an other colouration, viz. yellowish with blue spots. I prefer therefore to keep Bleeker's species apart. It is very close to *C. janthochir*.

10. **Callyodon janthochir** (Blkr.)

Scarus janthochir Bleeker, Nat. Tijdschr. Ned. Indië IV, 1852, p. 139. — Acta Soc. Sc. Indo-Neerl. VIII, 1860. Dertiende Bijdrage vischfauna Celebes, p. 54.

Pseudoscarus janthochir Bleeker, Versl. Akad. Amsterdam XII, 1861, p. 234. — Atl. Ichth. I, 1862, p. 30.

Pseudoscarus janthochir Günther, Cat. Brit. Mus. IV, 1862, p. 234.

Callyodon janthochir Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 444 (sine syn.).

D. IX. 10. A. III. 9. P. 2. 13. V. I. 5. Ll. 19 + 7. Ltr. $\begin{array}{c}1\frac{1}{2}\\ \hline 1\\ \hline 6-7\end{array}$.

Height 2.5—2.9, 3.1—3.6 in length with caudal. Head 2.6—2.9, 3.6—3.7 in length with caudal. Height of head 0.9—1.1 in its length. Eye 7.6—9.4, 3.2—3.8 in snout and 2.7—3.5 in convex interorbital space. Lips rather broad, but leaving about half of dental plate uncovered. Inner upper lip well developed, its connection with the outer lip much nearer to symphysis of upper jaw than to rictus. Nostrils small, the anterior one with a low rim. Teeth green. Posterior canines present or absent. Two rows of scales on cheek and a third row consisting of two or three scales on inferior preopercular limb. Six or seven scales before dorsal. Dorsal spines increasing in size posteriorly, the last about equal to snout and as long as dorsal rays. Anal about as deep as dorsal. Pectorals a little more or less than half length of snout shorter than head. Ventrals equal to head without snout or somewhat shorter. Caudal truncate, the lobes produced. Colour of preserved specimens reddish brown, most scales above anal and on caudal peduncle with or without a large yellow central spot. Thorax pinkish. Head yellowish or green, with exception of temporal and occipital regions, which are of the colour of the body. Pale creamy bands, bordered by a narrow dark line, along upper and lower lip. A median light ocellus, bordered by dark may be present on chin. A similar creamy band from corner of mouth to eye and continued as a ring round it. A dark brown narrow band from eye running forwards on snout and meeting that of the other side. Region behind this band creamy, the colour joined to that of the ring round eye. Dorsal creamy anteriorly, dark slaty posteriorly, with a greenish yellow edge, which is broader posteriorly. Anal creamy, slaty in its basal part posteriorly and with a broad terminal and a narrow basal greenish yellow band. Some elongate greenish yellow spots in its median part suggest an interrupted median band. In another specimen the anal is green, with a longitudinal median white band. Caudal sulphur yellow, the lobes pinkish, bordered by orange. In another specimen the caudal is green with a submarginal longitudinal white band on each lobe. Pectorals brown, excepting the terminal fourth of the lower rays, which is hyaline. Ventrals yellowish, the spine orange. Length 600 mm.

Habitat: Java (Batavia!); Celebes (Badjoa); Sulu Islands; Ternate. — Arabian Sea, Persian Gulf, Philippines, Ponapé. In sea.

Note. Fowler & Bean have united *Pseudoscarus altipinnis* and *Pseudoscarus godeffroyi* from the Pacific with *janthochir*. They may be right but as the colouring is rather different from Bleeker's *janthochir*, with which the specimens described above agree in all respects, I keep them apart provisionally.

11. **Callyodon vermiculatus** Fowler & Bean

Callyodon vermiculatus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 472.

Callyodon vermiculatus Fowler, Acad. Nat. Sc. Philadelphia, Monogr. 2, 1938, p. 185.

D. IX. 10. A. III. 9. P. 2. 12. V. I. 5. Ll. 18 + 7. Ltr. $\begin{array}{c}1\frac{1}{2}\\ \hline 1\\ \hline 6\end{array}$.

Height 2.3, 2.9 in length with caudal. Head 3, 3.7 in length with caudal. Height of head equal to its length. Eye 7.5, 2.9 in snout and 3.4 in convex interorbital space. Lips broad, covering greater part of dental plate. Inner upper lip small, its connection with the outer lip nearer rictus than symphysis of upper jaw. Nostrils rather close together, the anterior one with a low rim. Teeth green. A rather strong posterior canine in the upper jaw. Two rows of scales on cheek and a row of 3 scales on inferior preopercular limb. Six scales before dorsal. Dorsal spines subequal, covered by a very thick membrane, short, as long as half length of snout. Dorsal rays somewhat longer, the 8th ray longest, almost as long as snout. Anal deeper than soft dorsal, the longest rays about equal to snout. Pectorals triangular, a little more than half length of snout shorter than head. Ventrals more than half diameter of eye longer than postorbital part of head. Caudal semilunar, the lobes slightly produced. Colour of preserved specimens: Sides of head and a broad band along base of dorsal pinkish, apparently green in life, as remains of that colour are still visible here and there. Tail light, pinkish, dusky towards base of caudal, sharply defined from rest of body and head, which are purplish, much darker on back and on head. A broad pinkish band, but darker than tail, from below pectoral to middle of tail, most of the scales with dark vermiculations. The dark upper side of the head is sharply separated from the lighter sides by a pinkish band, probably green in life, running from above upper lip to lower border of eye and beyond, bordered above by a dark line. A dark line also separates this band from the upper lip, which is light red. A similar red band, bordered by a dark line, below lower lip on chin. Dorsal with a green edge and a green base, pinkish in the middle, the colours separated by dark lines. More or less distinct diffuse dark markings between the spines and rays on the median pinkish part of the fin. Anal violet, with a light edge, posterior and anterior borders also light and with remains of a green colour. Caudal lobes darker than rest of fin, pinkish but with a greenish hue. Middle of fin light, yellowish. Two parallel dark lines enclosing one ray separate the colour of the upper lobe and two similar lines that of the lower lobe from the rest of the fin. At the base of the fin these lines are more or less connected by a broader dark line, which forms a ring or an ocellus where it touches the upper and lower double lines. Pectorals pinkish with a median broad dark longitudinal band. Ventrals pinkish, with a green hue. Length 310 mm.

Habitat: Java (Batavia!); Halmahera; Tidore. — Philippines, Tongareva. In sea.

Note. The above description is made after a specimen of 310 mm from Batavia, which is longer than those described by Fowler & Bean. Some differences between my specimen and those of the authors, as less height of dorsal, greater depth of body, may be due to the larger size. In the general description the authors state that the teeth are whitish but in that of some of the specimens the teeth are called bluish. In my specimen the teeth are green.

12. **Callyodon nuchipunctatus** (C. V.)

Scarus nuchipunctatus Cuvier & Valenciennes, Hist. Nat. Poissons XIV, 1839, p. 224.
Scarus limbatus Cuvier & Valenciennes, ibid. p. 271 (partim?).
Scarus limbatus Bleeker, Verh. Bat. Gen. XXII, 1849. Gladsch. Labr. p. 60.
Scarus nuchipunctatus Bleeker, ibid. p. 62.
Pseudoscarus nuchipunctatus Bleeker, Versl. Akad. Amsterdam XII, 1861, p. 235. — Atl. Ichth. I, 1862, p. 31.
Pseudoscarus nuchipunctatus Günther, Cat. Brit. Mus. IV, 1862, p. 233. — Fishes of Zanzibar 1866, p. 107.
Pseudoscarus nuchipunctatus Guichenot, Mém. Soc. Imp. Sc. Nat. Cherbourg XI, 1865, p. 35.

Pseudoscarus limbatus Guichenot, ibid. p. 36.
?*Pseudoscarus flavomarginatus* Kner, Novara Exp. Fische 1865, p. 262.
Pseudoscarus nuchipunctatus Günther, Fische der Südsee III, 1909, p. 323.
Pseudoscarus nuchipunctatus M. Weber, Siboga Exp. Fische 1913, p. 387.
Pseudoscarus nuchipunctatus Fowler & Bean, Proc. U. S. Nat. Mus. LXII, 1922. Art. 2, p. 53.
Callyodon nuchipunctatus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 487.
Callyodon nuchipunctatus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 387.

D. IX. 10 (11). A. III. 9. P. 2. 12. V. I. 5. Ll. 18 + 7. Ltr. $\begin{array}{c} 1\frac{1}{2} \\ \hline 1 \\ \hline 6\text{—}7 \end{array}$.

Height 2.6—2.7, 3.2 in length with caudal. Head 2.9—3, 3.4—3.8 in length with caudal. Eye 5.3—7, 2.1—3.3 in snout and 1.8—2.7 in convex interorbital space. Lips generally broad, sometimes narrow, specially in larger specimens, covering a variable part of the dental plate, which is green. Inner upper lip rather short, its connection with outer lip nearer to rictus than to symphysis of upper jaw. Posterior canines generally present in large specimens. Anterior nostril round, with a low rim. Posterior nostril oval or semilunar. Two rows of scales on cheek with a third row of about 4 scales on inferior preopercular limb. Seven or eight scales before dorsal. First dorsal spine about equal to distance between rictus and eye, following spines slightly longer. Soft dorsal somewhat higher than anterior part of spinous dorsal. Third anal spine about as long as anterior dorsal spines. Soft anal deeper than soft dorsal, both fins pointed behind. Pectorals half length of snout shorter than head. Ventrals equal to snout and eye together. Caudal truncate or slightly rounded, the lobes produced in older specimens. Colour of preserved specimens dark reddish brown or purple brown, underside sometimes lighter. Often the scales of the body and tail with darker spots or stripes. Lips creamy, with a submarginal dark bluish or dark violet band along upper and lower lip, that along upper lip followed by a second one on chin, parallel to the first and continuous with that of the other side or not. Streaks of the same colour may be present along lower border of interopercle and preopercle. The bands round lips generally do not meet at rictus. From here a separate band to eye. In stead of bluish and dark these bands may be greenish and lighter than the surrounding. Light stripes may radiate from eye. Generally the scale immediately below the first scale of the lateral line has a large light orange or dark bluish blotch. Other scales between this one and the eye may have similar blotches. Dorsal and anal dark purple or bluish with a rather broad creamy or pinkish edge, the colour separated from that of the rest of the fin by a narrow dark line. Caudal of same colour as dorsal and anal, the upper and lower lobes creamy or pinkish, and the colours separated by a narrow dark line. Pectorals dark bluish, the upper rays more purple. Ventrals purple, the spine and the extremities of the rays lighter, sometimes creamy. Length 377 mm.

Habitat: Sumatra (Priaman); Java (Batavia); Celebes (Badjoa); Unang Island in Gulf of Tomini; Limbe Strait; Sulu Islands!; Ambon; Banda!; Timor; New Guinea (Humboldt Bay!, Moresby Bay). — Zanzibar, Seychelles, Hongkong, Riu Kiu Islands, Formosa, Philippines!, Pelew Islands, New Hebrides, Fiji, Kingsmill Islands, Society Islands, Paumotu Islands. In sea.

13. **Callyodon xanthopleura** (Blkr.)

Scarus xanthopleura Bleeker, Nat. Tijdschr. Ned. Indië IV, 1853, p. 499.
Pseudoscarus xanthopleura Bleeker, Versl. Akad. Amsterdam XII, 1861, p. 231. — Atl. Ichth. I, 1862, p. 24.
Scarus (Pseudoscarus) xanthopleura Steindachner, Denkschr. Akad. Wien XLI, 1879, p. 17.
Pseudoscarus xanthopleura Günther, Fische der Südsee III, 1909, p. 325.
?*Callyodon formosus* Fowler, Mem. B. P. Bischop Mus. X, 1928, p. 381 (nec C. V.).

D. IX. 10. A. III. 9. P. 2. 13. V. I. 5. Ll. 18 + 7. Ltr. $\dfrac{1\frac{1}{2}}{\dfrac{1}{6-7}}$.

Profile of head with a slight concavity before eyes. Height 2.8—3.1, 3.6—3.9 in length with caudal. Head 2.8—3, 3.6—3.7 in length with caudal. Height of head 1.1 in its length. Eye 6.3—6.8, 2.5—2.9 in snout and 2.2—2.3 in somewhat convex interorbital space. Lips rather narrow, the lower lip covering only a small part of the teeth. Inner upper lip well developed, its connection with the outer lip nearer symphysis of upper jaw than to corner of mouth. Dental plate greenish, white along the edge which is crenulated. A short canine posteriorly in upper jaw. Nostrils well developed, close together; the anterior one rounded with a low rim, the posterior one slightly smaller. Two rows of scales on cheek and a third row of two to three scales on inferior preopercular limb. Six or seven scales before dorsal. Dorsal spines and rays subequal, about as long as distance between corner of mouth and eye. Anal somewhat deeper than dorsal. Pectorals more than half length of snout shorter than head. Ventrals slightly more than postorbital part of head. Caudal emarginate, the lobes produced, curved, and pointed. Colour of preserved specimen dusky olive on back and anterior part of sides. Throat, belly, rest of sides and tail pinkish. Some of the scales of the sides and tail with a faint longitudinal streak. A pink band along upper lip and traces of a reddish band at some distance behind lower lip, curved back as a longitudinal band on anterior part of inferior preopercular limb. Dorsal pinkish with a dark violet edge and with the basal part of the membranes between the anterior spines of the same colour or with a streak of that colour between each pair of spines and rays. Anal uniform pinkish. Caudal pinkish with a violet hue. Upper rays of pectorals dark violet, rest of fin pinkish, with a violet hue in its basal part. Ventrals pinkish. Length 455 mm.

Habitat: Java (Batavia!). — New Ireland, Society Islands, Hawaii?. In sea.

Note. My description is made after two specimens 332 and 345 mm long, collected by Dr. J. Verwey at the fishmarket of Batavia. When fresh, one of them at least showed the colours and pattern as described by Bleeker. Fowler has united this species with *Scarus formosus* C. V. but Guichenot who redescribed the type of *formosus* (Mém. Soc. Imp. Sc. nat. Cherbourg XI, 1865, p. 57) mentions that it has only two rows of scales on the cheek, the lower row partly covering the preopercular limb which is otherwise naked.

14. **Callyodon pectoralis** (C. V.)

Scarus pectoralis Cuvier & Valenciennes, Hist. Nat. Poissons XIV, 1839, p. 269.

Scarus cyanognathos Bleeker, Verh. Bat. Gen. XXII, 1849. Gladsch. Labr. p. 63.

Pseudoscarus cyanognathos Bleeker, Versl. Akad. Amsterdam XII, 1861, p. 235. — Atl. Ichth. I, 1862, p. 32.

Pseudoscarus cyanognathus Günther, Cat. Brit. Mus. IV, 1862, p. 234. — Fishes of Zanzibar 1866, p. 108.

Pseudoscarus pectoralis Guichenot, Mém. Soc. Imp. Sc. Nat. Cherbourg XI, 1865, p. 55.

Pseudoscarus pectoralis Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 565.

Callyodon lazulinus Jordan & Seale, Bull. Bur. Fish. XXV (1905), 1906, p. 333.

Pseudoscarus pectoralis Günther, Fische der Südsee III, 1909, p. 324.

Pseudoscarus pectoralis M. Weber, Siboga Exp. Fische 1913, p. 387.

Pseudoscarus cyanognathus M. Weber, l.c.

Callyodon pectoralis Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p 453.

Callyodon cyanognathus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 379.

Callyodon pectoralis Fowler, ibid. p. 383. — Acad. Nat. Sc. Philadelphia, Monogr. 2, 1938, p. 204.

D. IX. 9—10. A. III. 9. P. 2. 12. V. I. 5. Ll. 16—19 + 7. Ltr. $\begin{array}{c}1\frac{1}{2}\\\hline 1\\\hline 6-7\end{array}$.

Height 2.8—3.2, 3.8—4.1 in length with caudal. Head 2.6—3.1, 3.8—4.1 in length with caudal. Height of head 1.1 in its length. Eye 6.2—7, 2.5—3 in snout 2—2.5 in convex interorbital space. Lips rather broad. Inner upper lip well developed, its connection with the outer lip midway rictus and symphysis of upper jaw or somewhat nearer the former. Dental plate green. One or two posterior canines in the upper jaw may be present. Anterior nostril with a low rim, posterior one a round or somewhat ovate opening. Two rows of scales on cheek and a third row of 3—5 scales on inferior preopercular limb. Six scales before dorsal. Dorsal spines subequal, as long as distance between eye and rictus or half diameter of eye longer. Anal slightly deeper than dorsal. Both fins pointed behind. Pectorals half length of snout shorter than head or somewhat longer. Ventrals pointed, slightly more than postorbital part of head. Upper and lower lobes of caudal falcate and produced. Colour of preserved specimens yellowish pink or reddish brown. Upper part of head, anterior part of back and sometimes also anterior part of sides much darker, dark olive or slate coloured with a purplish tinge. Lips broadly yellow, this colour continued behind rictus as a band running along lower border of eye horizontally to end of opercle and separating the dark colour of the upper parts from the light colour of the lower parts. A similar short band on chin, parallel to that of the lower lip. Dark region of postorbital part of head immediately above the yellow band, often darker than the rest and forming a broad dark postocular longitudinal band. A short yellow streak from upper part of frontborder of eye directed anteriorly may be present. Dorsal pinkish violet with a lighter yellowish basal and a similar terminal longitudinal band or creamy with darker basal and terminal bands. Anal yellowish or pinkish, with a broader or narrower terminal band. Pectorals yellowish or hyaline, the median part darker. Ventrals hyaline, spine and first ray often pinkish. Caudal yellow, the lobes and often also the base of the median rays orange, violet or purplish. Length over 350 mm.

Habitat: Java (Batavia!); Celebes (Kait Point, Libani Bay); Sulu Islands!; Karkaralong Island!; Sula Islands!; Banda! — Zanzibar, Red Sea, Muscat, Seychelles, Philippines!, Pelew Islands, New Britain, Solomon Islands, New Hebrides, Samoa, Christmas Island, Society Islands. In sea.

Note. As I find amongst my material specimens which are intermediate in colour between *pectoralis* and *cyanognathus,* I have united the two.

15. **Callyodon macleayi** Jord. & Seale

Pseudoscarus frontalis Macleay, Proc. Linn. Soc. New S. Wales VII, 1882, p. 590 (nec C. V.).
Callyodon macleayi Jordan & Seale, Bull. Bureau Fish. XXV (1905), 1906, p. 331.

"Two series of scales on the cheek, the lower of seven scales; one scale beneath on the praeopercular limb. Lips narrow, jaws blue, with strong pointed teeth at the angle of the upper. The head is flat and almost horizontal above, until above the mouth, where it becomes suddenly rounded and vertical. The scales are large. L. lat. 22. Fifteen pectoral rays; tail with the outer rays much produced. Mr. Goldie's note of the coloration is, "Green back, dark purple over nose, fins and belly light green, blue and purple streaks under the mouth, eye dark gold, fins and tail purple and blue." The upper half of the pectorals is dark coloured beneath. A large fish over 18 inches in length." (After Macleay, not seen by me).

Nomen indig: Naitahe (Port Moresby).

Habitat: New Guinea (Port Moresby). In sea.

Note. Fowler (Mem. B. P. Bishop Mus. X, 1928, p. 378) has united this species with *C. jordani* (Jenk.). Slight differences in the number of pectoral rays and in the extension of the lips make me hesitate to follow this author in his synonymy.

16. **Callyodon muricatus** (C. V.)

Scarus muricatus Cuvier & Valenciennes, Hist. Nat. Poissons XIV, 1839, p. 208.
Scarus muricatus Bleeker, Verh. Bat. Gen. XXII, 1849. Gladsch. Labr. p. 46.
Pseudoscarus muricatus Bleeker, Versl. Akad. Amsterdam XII, 1861, p. 232. — Atl. Ichth. I, 1862, p. 26.
Pseudoscarus muricatus Günther, Fische der Südsee III, 1909, p. 316.
Callyodon muricatus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 495.
Callyodon muricatus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 388.

D. IX. 9—10 (11). A. III. 9. P. 2. 14. V. I. 5. Ll. 17—19 + 8—10.

Ltr. $\frac{1\frac{1}{2}}{\frac{1}{5-7}}$.

Height 2.4—2.5, 2.9—3.1 in young specimens. Head rather compressed, its upper profile with a slight prominence above and close before nostrils, 2.4—3. Eye 5.8—8.3, 3.3—4.7 in snout and 2—2.8 in very convex interorbital space. Lips rather short. Inner upper lip rather poorly developed, well developed in young ones. Posterior nostril much larger than anterior one. Teeth pinkish, rugose. Two rows of scales on cheek and a third one separated from those above by a narrow interspace on inferior preopercular limb. Six scales before dorsal. Dorsal spines subequal, dorsal rays slightly longer. Anal similar to dorsal. Pectorals about half length of snout shorter than head. Ventrals about equal to postorbital part of head. Caudal rounded, the lobes produced in large specimens. Colour more or less uniform brown. In young specimens white spots on the body, each spot the size of a scale. Length over 1000 mm (Compiled, only small specimens seen by me).

Habitat: Simalur!; Java (Batavia); North Celebes; Moluccas, Binang Unang Island. — Siam, Philippines, Pelew Islands, Solomon Islands, Ponapé, Samoa. In sea.

17. **Callyodon dimidiatus** (Blkr.)

Scarus dimidiatus Bleeker, Acta Soc. Sc. Indo-Neerl. VI, 1859, Bijdr. kennis vischf. Nieuw Guinea, p. 17.
Pseudoscarus dimidiatus Bleeker, Versl. Akad. Amsterdam XII, 1861, p. 239. — Atl. Ichth. I, 1862, p. 41.
Callyodon fumifrons Jordan & Seale, Bull. Bur. Fish. XXV (1905), 1906, p. 326.
Pseudoscarus dimidiatus Günther, Fische der Südsee III, 1909, p. 308.
Callyodon dimidiatus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 425.
Callyodon dimidiatus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 379.
Scarus dimidiatus Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 336.

D. IX. 10 (11). A. III. 9. P. 2. 11—12. V. I. 5. Ll. 18 + 7.

Ltr. $\frac{1\frac{1}{2}}{\frac{1}{7}}$.

Height 2.7—3, 3.1—3.5 in length with caudal. Head 3—3.1, 3.5—3.6 in length with caudal. Height of head 1—1.1 in its length. Eye 6.9—7.3, 3.1—3.4 in snout and 2.2—2.7 in convex interorbital space. Lips rather broad, generally covering the greater part of the teeth. Inner upper lip well developed, its point of fusion with the outer lip much nearer symphysis than rictus. Anterior nostril with a short tube, posterior nostril an oblique slit. Dental plate yellowish. No posterior canines. Two transverse rows of scales on cheek and a third row of 2—4 scales on inferior preopercular limb. Six to seven scales before dorsal. Dorsal spines subequal, about twice eye. Soft dorsal not higher than spinous part. Third anal spine as long as dorsal spines. Soft anal similar to soft dorsal. Pectorals half length of snout shorter than head, or somewhat shorter or longer. Ventrals equal to head without snout, or half diameter of eye shorter. Caudal truncate or slightly rounded. Colour of preserved specimens: Head and anterior half of body creamy or salmon coloured, posterior part of body and tail darker, each scale with a broad purplish violet border. The line of demarcation between the two colours generally well marked and running from below 7th or 8th dorsal spines obliquely forwards to lower part of pectoral axil. A broad yellow band from rictus through lower part of eye and from there slightly curved downwards to upper part of pectoral axil. A yellow band, sharply defined anteriorly, more or less diffuse posteriorly connecting eyes over interorbital space. The snout before this band is purplish violet, but the most anterior part of snout and the lips are salmon coloured. A broad purplish violet band from hindmargin of eye to pectoral axil, running immediately above the yellow band mentioned above, and bordered superiorly by a continuation of the yellow band, which connects the eyes. Dorsal violet with a lighter or darker median longitudinal band and a rather broad yellow edge. Anal yellowish, its basal part violet, the two colours sharply defined. Caudal orange or greenish yellow, with or without light blue blotches. Pectorals with the upper rays salmon, the middle rays brownish olive and the lower rays yellowish orange, hyaline towards the tips. Ventrals yellowish or orange. Length 332 mm.

Habitat: Sulu Islands!; New Guinea (Manokwari). — Philippines!, Pelew Islands, Solomon Islands, Tongatabu Islands, Samoa. In sea (Fowler & Bean l.c. record a specimen from fresh water!).

18. **Callyodon frenatus** (Lac.)

Scarus frenatus Lacepède, Hist. Nat. Poissons IV, 1802, p. 13.
Scarus frenatus Cuvier & Valenciennes, Hist. Nat. Poissons XIV, 1839, p. 227.
Scarus frenatus Bleeker, Nat. Tijdschr. Ned. Indië III, 1852, p. 770.
Pseudoscarus frenatus Bleeker, Versl. Akad. Amsterdam XII, 1861, p. 239. — Atl. Ichth. I, 1862, p. 40.
Pseudoscarus viridis Günther, Cat. Brit. Mus. IV, 1862, p. 220 (nec Bl.).

Pseudoscarus fraenatus Guichenot, Mém. Soc. Imp. Sc. Nat. Cherbourg XI, 1865, p. 37.
Pseudoscarus frenatus Peters, Monatsber. Akad. Berlin 1876, p. 844.
Pseudoscarus frenatus Günther, Fische der Südsee III, 1909, p. 307.
Callyodon frenatus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 436.
Callyodon frenatus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 380.
Scarus frenatus Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 338.

D. IX. 10 (11). A. III. 9. P. 2. 12. V. I. 5. Ll. 17—18 + 7—8. Ltr. $\begin{array}{c} 1\frac{1}{2} \\ \hline 1 \\ \hline 6-7 \end{array}$.

Height 2.5—2.8, 3.1—3.4 in length with caudal. Head 2.9—3.1, 3.8 in length with caudal. Height of head 1—1.1 in its length. Eye 5.7—6.8, 2.2—2.7 in snout and 2—2.5 in convex interorbital space. Lips broad, covering greater part of dental plate. Inner upper lip short, its point of connection with the outer lip much nearer rictus than symphysis. Nostrils small, the anterior with a very short valve, the posterior an oblique slit. Dental plate yellowish or pinkish. One to three canines posteriorly in the upper and lower jaw. Two transverse rows of scales on cheek, preopercular limb naked or with a single scale posteriorly. Four to five scales before dorsal. Dorsal spines slightly decreasing in length posteriorly, the first almost as long as snout. Soft dorsal of the same height as spinous part. Third anal spine equal to distance between rictus and eye. Soft anal similar to soft dorsal, both fins pointed behind. Pectorals about half diameter of eye longer than head without snout. Ventrals slightly shorter. Caudal truncate, the lobes produced and pointed. Colour of preserved specimens: Head and anterior part of body to vertical through tip of depressed ventral reddish brown, rest of body and tail much lighter, the scales often with a darker centre. The two colours sharply defined. A yellow band along upper lip, continued at rictus through lower portion of eye to opercular flap. A narrower yellow band along lower lip followed on chin by another; where it crosses the isthmus a longitudinal yellow band starts, running along isthmus in the median line, and often continued on thorax to ventrals or to anal. A short yellow stripe on both sides of this band below anterior part of preopercular limb. Basal half of dorsal deep violet, distal part creamy with a brown longitudinal subterminal line. Anal deep violet basally, creamy distally, the two colours sharply defined. Caudal dark violet at base, then creamy. A narrow vertical violet band through middle of caudal, bent backwards near upper and lower lobes. Sometimes also a violet margin to the fin. Upper and lower rays reddish, this colour separated from the creamy colour of the rest of the fin by a narrow violet line. A deep violet blotch at superior end of base of pectorals, which are yellowish in their basal part. Ventrals yellowish, the spine and the first ray pinkish. Length 295 mm.

Habitat: Celebes (Makassar!, Bulukomba); Limbe Strait; Togian Island; Halmahera; Buru; Banda!; New Guinea (Manokwari). — Mauritius, Seychelles, Philippines, New Britain, Louisade Archipelago, Solomon Islands. In sea.

19. **Callyodon javanicus** (Blkr.)

Scarus javanicus Bleeker, Nat. Tijdschr. Ned. Indië VI, 1854, p. 198.
Pseudoscarus javanicus Bleeker, Versl. Akad. Amsterdam XII, 1861, p. 237. — Atl. Ichth. I, 1862, p. 36.
?*Pseudoscarus javanicus* Günther, Fishes of Zanzibar 1866, p. 104.
Callyodon ogos Seale, Philipp. Journ. Sc. IV, 1909, p. 527.

D. IX. 10 (11). A. III. 9 (10). P. 2. 11—12. V. I. 5. Ll. 18 + 7. Ltr. $\begin{array}{c}1\frac{1}{2}\\ \hline 1\\ \hline 6-7\end{array}$.

Height 2.7—2.9, 3.3—3.5 in length with caudal. Head 3.1—3.2, 3.8—3.9 in length with caudal. Height of head 1—1.1 in its length. Eye 5.9—7.1, 2.3—2.8 in snout and 2—2.3 in convex interorbital space. Lips broad, covering greater part of dental plate. Inner upper lip very short, its connection with the outer lip much nearer to rictus than to symphysis of upper jaw. Dental plate yellowish. One or two posterior canines in the upper jaw and sometimes also in the lower jaw. Nostrils minute, the anterior rounded with a low rim, the posterior oval. Two rows of scales on cheek, the lower covering part of the preopercular limb, which is otherwise naked, excepting one scale near the preopercular edge. Four or five scales before dorsal. First dorsal spine equal to snout or to snout and eye together, following decreasing in length posteriorly, the last one about equal to distance between eye and corner of mouth or a little longer. Soft dorsal of same height as posterior part of spinous dorsal. Third anal spine almost as long as first dorsal ray. Soft anal about as deep as soft dorsal. Pectorals as long as distance between corner of mouth and gillopening. Ventrals equal to head without snout or somewhat longer. Caudal truncate, the lobes more or less produced. Colour of preserved specimens: Body and anterior part of tail purplish, each scale with a dark purple base and a yellow centre, the purple base less or absent in posterior part of tail and caudal peduncle, which is yellowish. Anterior part of back from occiput to about 5th dorsal spine light orange. A very broad yellow band, obliquely downwards from hindborder of eye, widening and much broader than diameter of eye posteriorly, through origin of pectoral, ending above anus or not so far. Inner upper lip and sides of snout to eye generally yellow. Lower lip with a yellow band, followed by another yellow band crossing chin, and usually some yellow markings on interopercle. A median yellow band from the chin band to base of ventrals and continued to anal. Dorsal yellowish, with a submarginal longitudinal violet band, bordered above and below by a narrow dark purple line, getting indistinct anteriorly. Base of dorsal posteriorly to 5th spine deep purple, fading again on last rays. Anal deep purple with a broad yellow edge. Caudal purple at base, lighter distally, the upper and lower lobes yellow. Anterior pectoral rays and base of other rays yellow, rest of fin hyaline. A triangular deep purple spot at base of anterior rays. Ventrals yellowish with a longitudinal median pinkish streak. Length 275 mm.

Habitat: Java (Batavia). — Zanzibar?, Philippines! In sea.

Note. I have examined the type and paratype of *Callyodon ogos* Seale, which species has been wrongly united by Fowler & Bean with *quoyi* Blkr (= *bleekeri*). It agrees in all respects with *javanicus* and the description of the colour in life as given by Seale corresponds almost exactly with that given by Bleeker.

Günther has recorded *javanicus* from Zanzibar. The colour in life, as described by the author, however is utterly different and I think the specimen must belong to another species.

20. **Callyodon hypselopterus** (Blkr.)

Scarus hypselopterus Bleeker, Nat. Tijdschr. Ned. Indië IV, 1853, p. 496.
Pseudoscarus hypselopterus Bleeker, Versl. Akad. Amsterdam XII, 1861, p. 237. — Atl. Ichth. I, 1862, p. 36.
Pseudoscarus hypselopterus Günther, Fische der Südsee III, 1909, p. 311.
Callyodon hypselopterus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 484.
Callyodon hypselopterus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 387.

D. IX. 10 (11). A. III. 9 (10). P. 2. 12. V. I. 5. Ll. 17—19 + 7—9. Ltr. $\begin{array}{c} 1\frac{1}{2} \\ \hline 1 \\ \hline 6-7 \end{array}$.

Height 2.6, 3.2 in length with caudal. Head 3.1—3.2, 3.8—3.9 in length with caudal. Height of head equal to or slightly less than its length. Eye 6.5, 2.4—2.7 in snout and 2.2—2.4 in somewhat convex interorbital space. Lips broad, covering greater part of dental plate. Inner upper lip very short, its connection with the outer lip much nearer to rictus than to symphysis of upper jaw. Dental plate yellowish. One or two posterior canines in the upper jaw and often one in the lower jaw. Nostrils minute. Two rows of scales on cheek, the lower row covering part of the preopercular limb, which is otherwise naked, excepting one scale near the preopercular edge. Four scales before dorsal. First dorsal spine equal to snout, following decreasing in length posteriorly, the last about equal to distance between eye and corner of mouth. Soft dorsal as high as posterior part of spinous dorsal. Third anal spine slightly less than dorsal spines. Soft anal about as deep as soft dorsal. Pectorals as long as distance between rictus and gillopening. Ventrals slightly shorter, more than head without snout. Caudal truncate, the lobes more or less produced. Colour of preserved specimens brown above, yellowish below. Caudal peduncle also yellowish. More or less distinct white longitudinal streaks along scales of belly. A triangular spot at upper part of base of pectorals deep brown. Sometimes a deep brown spot on scale immediately below first scale of lateral line. Dorsal yellowish or brownish with a darker margin. Anal yellowish, with a dark patch on the two or three anterior rays. Caudal yellowish, the lobes darker. Pectorals and ventrals yellowish. Length 385 mm.

Habitat: Java (Batavia). — Philippines!, Society Islands.

21. **Callyodon forsteni** (Blkr.)

Pseudoscarus Forsteni Bleeker, Versl. Akad. Amsterdam XII, 1861, p. 238. —Atl. Ichth. I, 1862, p. 38.

Callyodon latifasciatus Seale & Bean, Proc. U. S. Nat. Mus. XXXIII, 1908, p. 237.

Callyodon forsteni Snyder, ibid. XLII, 1912, p. 509.

Callyodon tricolor Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 460 (nec Blkr.).

D. IX. 10. A. III. 9. P. 2. 12. V. I. 5. Ll. 25—26. Ltr. $\begin{array}{c}1\frac{1}{2}\\ \hline 1\\ \hline 7\end{array}$.

Dorsal profile of head evenly convex. Height 2.5—3, 3.1—3.6 in length with caudal. Head 2.8—3, 3.6—3.7 in length with caudal. Height of head 1.1—1.2 in its length. Eye 6—6.7, 2.4—2.8 in snout and 2—2.7 in convex interorbital space. Anterior nostril with a low rim, posterior nostril a round opening. Lips rather broad, the border of the lower lip oblique, but in large specimens almost vertical. Inner upper lip ending and connected with outer lip at a point about midway between corner of mouth and symphysis of upper jaw. Dental plate yellowish or olive, white along the cutting edge. One or two posterior canines in the upper jaw generally present. Two transverse rows of scales on the cheek and a third row of 3—5 scales on inferior preopercular limb. Six or seven scales before dorsal. Dorsal spines subequal, about 1.5 diameters of eye. Soft dorsal not higher than spinous part. Third anal spine somewhat less than soft anal, which is slightly deeper than soft dorsal. Pectorals slightly longer than head without snout. Ventrals pointed, equal to eye and snout. Caudal truncate, the upper and lower lobes produced. Colour of preserved specimens brownish red above, belly and sides of head lighter. A dark brown very broad band with a bluish hue from hindborder of eye to caudal, broadest below and behind pectorals, where it may be 4 scales deep, getting less distinct and much narrower towards caudal peduncle. Upper lip pinkish or yellowish. Dorsal pinkish, with a violet outer border. Anal yellowish or pinkish. Caudal yellowish, the upper and lower lobes darker. Pectorals with a more or less distinct brownish blotch at base, otherwise creamy, the posterior half almost hyaline. Ventrals yellowish or pinkish, the spine and first ray somewhat darker. Length 318 mm.

Habitat: Java (Batavia!); Birabirahan Island, Borneo; Doworra Island; Sulu Islands; Buru. — Riu Kiu Islands, Philippines! In sea.

22. **Callyodon tricolor** (Blkr.)

Scarus tricolor Bleeker, Verh. Bat. Gen. XXII, 1849. Gladsch. Labr. p. 59.
Pseudoscarus tricolor Bleeker, Versl. Akad. Amsterdam XII, 1861, p. 238. — Atl. Ichth. I, 1862, p. 39.
Pseudoscarus tricolor Günther, Cat. Brit. Mus. IV, 1862, p. 229. — Fische der Südsee III, 1909, p. 315.
Callyodon tricolor Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 383.

D. IX. 10 (11). A. III. 9. P. 2. 12. V. I. 5. Ll. 18—20 + 6—8.

Ltr. $\begin{array}{c}1\frac{1}{2}\\ \hline 1\\ \hline 6\end{array}$.

Dorsal profile with a depression before eye. Height 2.9—3, 3.5—3.6 in length with caudal. Head 2.9—3, 3.4—3.6 in length with caudal. Height of head 1.1—1.2 in its length. Eye 5.8—6.7, 2.4—2.8 in snout and 2—2.2 in slightly convex interorbital space. Anterior nostril with a low rim, posterior one round or oval. Lips broad, covering greater part of dental plate, which is white or yellowish. Inner upper lip ending and connected with outer lip at a point about midway between corner of mouth and symphysis of upper jaw. No posterior canines. Two transverse rows of scales on cheek and a third row of 3—5 scales on inferior preopercular limb. Six or seven scales before dorsal. Dorsal spines subequal, equal to distance between eye and corner of mouth. Soft dorsal not higher than spinous part of fin. Third anal spine as long as dorsal spines. Soft anal somewhat deeper than soft dorsal. Pectorals equal to or slightly longer than head without snout. Ventrals pointed, equal to eye and snout. Caudal truncate or slightly rounded, the lobes scarcely produced. Head, body, and tail as well as the dorsal dark purplish brown. Region before and above anal, as well as that fin, caudal peduncle and caudal light creamy or pinkish white. Sides of body and tail with a blue gloss, the centre of each scale of that colour. In bleached specimens the fish is light all over but the dark centres of the scales remain visible. Superior pectoral rays and basal part of other rays purplish brown, rest of fin hyaline. Ventrals yellowish or light purplish. Length 376 mm.

Habitat: Java (Batavia); Celebes (Makassar); Karkaralong Islands!; Ambon. — Philippines, Shortland Island, Wake Island. In sea.

23. **Callyodon rubroviolaceus** (Blkr.)

Scarus rubroviolaceus Bleeker, Verh. Bat. Gen. XXII, 1849. Gladsch. Labr. p. 52.
Pseudoscarus rubroviolaceus Bleeker, Versl. Akad. Amsterdam XII, 1861, p. 237. — Atl. Ichth. I, 1862, p. 37.
Pseudoscarus rubro-violaceus Günther, Cat. Brit. Mus. IV, 1862, p. 229.
Pseudoscarus rubro-violaceus Guichenot, Mém. Soc. Imp. Sc. Nat. Cherbourg XI, 1865, p. 51.
Pseudoscarus rubroviolaceus Steindachner, Denkschr. Akad. Wien LXXI, 1902, p. 152.
Scarus calus Fowler, Journ. Acad. Nat. Sc. Philadelphia (2) XII, Prt. 4, 1904, p. 542.
Callyodon ruberrimus Jordan & Seale, Bull. Bur. Fish. XXV, (1905) 1906, p. 316.
Callyodon upolensis Jordan & Seale, ibid. p. 319.
Callyodon macrorhinus Seale & Bean, Proc. U. S. Nat. Mus. XXXIII, 1908, p. 246.
Pseudoscarus ruberrimus Günther, Fische der Südsee III, 1909, p. 314.
Pseudoscarus rubroviolaceus M. Weber, Siboga Exp. Fische 1913, p. 389.

Callyodon rubroviolaceus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 469.
Callyodon rubroviolaceus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 384.

D. IX. 10 (11). A. III. 9. P. 2. 13. V. I. 5. Ll. 19 + 7 or 20 + 7 [1]). Ltr. $\begin{array}{c}1\frac{1}{2}\\ \hline 1\\ \hline 6\end{array}$.

Height 3, 3.4—3.6 in length with caudal. Head 2.8—3.1, 3.4—3.5 in length with caudal. Height of head 1.2 in its length. Eye 4.9—6.9, 1.9—3.1 in snout and 1.7—2.2 in somewhat convex interorbital space. Lips narrow in large specimens, leaving the greater part of the dental plate uncovered; in smaller specimens the lips are broad. Inner upper lip well developed, its anterior end where it is connected with the outer lip, midway between corner of mouth and symphysis of upper jaw. Nostrils well developed, the anterior one with a rim, the posterior one more or less oval. Dental plate white or yellowish. A short posterior canine in the upper jaw may be present. Two transverse rows of scales on cheek, and a third row of 2—3 scales on inferior preopercular limb. Six scales before dorsal. Dorsal spines subequal, as long as distance between eye and corner of mouth or somewhat longer in small specimens. Soft dorsal slightly higher. Anal slightly deeper than soft dorsal. Pectorals somewhat longer than snout and eye. Ventrals equal to snout in large specimens, to snout and eye in small ones. Caudal rounded in young, truncate with the lobes somewhat produced in adults. Colour of preserved specimens greenish grey or reddish. Scales of sides of head behind eye and of body and tail with broader or narrower reddish brown horizontal sometimes bifurcating bands. These markings may be wanting or developed on body and tail only. In young ones there may be a double longitudinal series of distant pearly blotches on the sides, each blotch covering one scale. Dorsal with a dark edge and with more or less light and dark stripes in its posterior half; sometimes almost uniformly reddish. Anal uniformly yellowish or reddish. Superior rays as well as basal part of inferior rays of pectoral brownish red, rest hyaline. A reddish brown band along its base. Ventrals yellowish, mottled with white in young ones. Caudal greenish, brownish towards its extremity. Length 553 mm.

Habitat: Sumatra (Padang); Nias!; Java (Batavia); Buton; Karkaralong Islands!; Birabirahan Island; Borneo; Celebes (Kait

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1) The two parts of the lateral line overlap.

Point, Libany Bay); Binang Unang Island. — Zanzibar, Sokotra, Philippines, Guam, Wake Island, Solomon Islands, Samoa, Kingsmill Islands, Society Islands, Tubuai, Paumotu Islands, Hawaii. In sea.

Note. The structure of the scales, which have rows of minute pearly knobs described by M. Weber l.c. is not characteristic for this species but occurs in other species as well, specially in young specimens.

24. **Callyodon verweyi** n. sp.

D. IX. 10. A. III. 9. P. 2. 12. V. I. 5. Ll. 16 + 7. Ltr. $\begin{array}{c} 1\frac{1}{2} \\ \hline 1 \\ \hline 6-7 \end{array}$.

Head gibbous, eye low down. Profile of head before eyes strongly declivuous. Height 2.5, 3.3 in length with caudal. Head 2.6, 3.7 in length with caudal. Height of head equal to its length. Eye 8.9, 3.2 in snout and 3.3 in very convex interorbital space. Lips narrow. Inner upper lip well developed, its connection with the outer lip about midway between rictus and symphysis of upper jaw. Nostrils well developed, the anterior one with a low rim, the posterior one a round opening. Dental plate white, with a slight greenish hue, smooth but the individual teeth distinct. Two strong posterior canines in the upper jaw and one in the lower jaw. Two transverse rows of scales on cheek and two scales on inferior preopercular limb. Five scales before dorsal. Dorsal spines subequal, somewhat more than distance between eye and corner of mouth. Posterior dorsal rays somewhat longer than spines. Soft anal slightly deeper than soft dorsal. Pectorals half diameter of eye longer than head without snout. Ventrals equal to snout and half diameter of eye. Caudal emarginate, the lobes produced, falcate. Colour of preserved specimen reddish brown. Upper lip narrowly creamy, then pink and then green, the colours separated by narrow dark lines. Lower lip narrowly bordered with cream colour. Chin pink, transversed by a broad violet band, bordered above and below by a narrow dark line; this band continued in the direction of the eye, tapering here and of a green colour. The green band from upper lip runs backwards to lower part of frontborder of eye and is continued as a narrow band along its lower border. Snout and interorbital space violet, transversed by a green band connecting eyes. Dorsal with a green edge, followed by a pink longitudinal band and a violet basal one, separated by narrow dark lines, that between the pink and the violet band more or less wavy. Anal violet basally, pinkish distally and with a greenish median band, the colours separated by narrow dark lines. Upper pectoral rays violet, median rays and base of lower rays dark brown with a greenish tinge. Ventrals pink. Median caudal rays dusky greenish at base, pinkish distally, the lobes violet, more or less mixed with green. Length of the single specimen 379 mm.

Habitat: Java (Batavia!).

Note. This species resembles *C. jordani* Jenkins but differs by having nearly white teeth, by the position of the eye, the lower border of which is almost in the level of the corner of the mouth and in the colouration.

25. **Callyodon papuensis** (Macleay).

Pseudoscarus papuensis Macleay, Proc. Linn. Soc. New S. Wales VII, 1882, p. 590.

"Three series of scales on the cheek, covering the praeopercular limb. Jaws whitish, the upper not half covered by the lip, and with two strong teeth at each angle. The tail is crescent shaped, 13 rays in the pectoral fins; profile moderately convex. L. lat. 21. Colour in spirits uniform yellowish. Mr. Goldie says: "Green with edge of scales bright pink, side fins green and pink, tail green with pink stripe on top and bottom, but edged with green, top and bottom fins pink edged with turquoise blue, orbit hazel". Length 400 mm. (After Macleay, not seen by me.)

Nomen indig.: Niiti (Port Moresby).

Habitat: New Guinea (Port Moresby).

Note. Fowler & Bean (Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 462) placed *papuensis* under the synonymy of *C. blochii*. Macleay however does not mention the markings on the head, which are so characteristic for lastnamed species.

26. **Callyodon viridibusius** Fowler & Bean.

Callyodon viridibusius Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 459.
Scarus viridibusius Herre, Notes Fish. Zool. Mus. Stanford Univ. 1931, p. 79.

D. IX. 10. A. III. 9. Ll. 18 + 7. Ltr. $\begin{array}{c}1\frac{1}{2}\\ \hline 1\\ \hline 6\end{array}$.

Height $2^{3}/_{5}$—$2^{7}/_{8}$. Head $2^{7}/_{8}$—$3^{1}/_{6}$. Eye 6—$6^{4}/_{5}$, $2^{1}/_{5}$—$2^{1}/_{2}$ in snout, 2—2$^1/_4$ in broadly convex interorbital space. The lips cover three fourths of the teeth, which are pale rose. Canines generally present. Two transverse rows of scales on cheek and 3 to 5 scales on inferior preopercular limb. Seven or eight scales before the dorsal. Ninth dorsal spine 2$^7/_8$—3 in head, first ray 2$^4/_5$—3$^1/_8$. Third anal spine 2$^4/_5$—3$^3/_5$, first ray 2$^7/_8$—2$^9/_{10}$. Caudal slightly concave behind. Body deep dusky green, head and breast dark neutral brown; caudal peduncle posteriorly and caudal fin dull brown. Dorsal neutral dusky. Anal grayish to pale brown. Paired fins brownish. Length 262 mm. (After Fowler & Bean, not seen by me.)

Habitat: Sulu Islands; Celebes (Limbe Strait); Buru. — Philippines. In sea.

27. **Callyodon moresbyensis** (Macleay)

Pseudoscarus Moresbyensis Macleay, Proc. Linn. Soc. New S. Wales VII, 1882, p. 591.

"Three series of scales on the cheek, the middle series with five scales, the lower with two, these last just reaching the praeopercular limb. Jaws whitish and half covered by the lips which are rather broad and like those of *P. labiosus*; the tail is truncate. Mr. Goldie thus describes the colour in the fresh specimen: "Green and magenta body, top of head brownish, rest green, tail green and magenta with sea-green edges, orbit light hazel"." (After Macleay, not seen by me.)

Nomen indig.: Carava (Port Moresby).

Habitat: New Guinea (Port Moresby).

Note. Fowler & Bean (Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 457) place this unsufficiently described species among the synonymy of *C. balinensis*, although with a query.

28. **Callyodon dubius** (Benn.)

Scarus dubius Bennett, Zool. Journ. IV, 1828, p. 37.
Scarus Bennetti Cuvier & Valenciennes, Hist. Nat. Poissons XIV, 1839, p. 270.
Scarus aeruginosus Bleeker, Verh. Bat. Gen. XXII, 1849. Gladsch. Labr. p. 58 (nec C. V.).
Scarus balinensis Bleeker, ibid. XXIII, 1849. Bijdr. ichth. fauna Bali, p. 8.
Pseudoscarus balinensis Bleeker, Versl. Akad. Amsterdam XII, 1861, p. 238. — Atl. Ichth. I, 1862, p. 39.
Pseudoscarus aeruginosus Bleeker, l.c. — ibid. p. 40 (nec C. V.).

Pseudoscarus balinensis Günther, Cat. Brit. Mus. IV, 1862, p. 228.
Pseudoscarus dubius Günther, ibid. p. 229.
Pseudoscarus aeruginosus Günther, l.c. (nec. C. V.).
Pseudoscarus aeruginosus Day, Fishes of India, Prt. 3, 1877, p. 412.
Callyodon dubius Jordan & Evermann, Bull. U. S. Fish. Comm. XXIII (1903), 1905, p. 350.
Callyodon lacerta Jordan & Seale, Bull. Bur. Fish. XXV (1905), 1906, p. 319 (nec C. V.?).
Callyodon balinensis Jordan & Seale, ibid. p. 320.
Pseudoscarus dubius Günther, Fische der Südsee III, 1909, p. 313.
Pseudoscarus dubius M. Weber, Siboga Exp. Fische 1913, p. 386.
Callyodon balinensis Fowler & Bean, Proc. U. S. Nat. Mus. LXII, Art. 2, 1922, p. 51.
Callyodon dubius E. K. Jordan, ibid. LXVI, Art. 33, 1925, p. 31.
Callyodon balinensis Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 457.
Callyodon dubius Fowler & Bean, ibid. p. 473.
Callyodon balinensis Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 383.
Callyodon dubius Fowler, ibid. p. 385.
Scarus dubius Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 332.
Scarus balinensis Herre, ibid. p. 334.

D. IX. 10 (11). A. III. 9 (10). P. 2. 12. V. I. 5. Ll. 24. Ltr. $\frac{1\frac{1}{2}}{\frac{1}{6-7}}$.

Height 2.7—3, 3.1—3.6 in length with caudal. Head 3.1—3.2, 3.6—3.7 in length with caudal. Height of head 1—1.2 in its length. Eye 4.8—5.9, 1.7—2.4 in snout and 1.6—2 in rather convex interorbital space. Corner of mouth half diameter of eye or more below level of lower border of eye. Upper lip with an almost straight lower border, covering half of the dental plate, which is white or pinkish. Anterior end of inner upper lip, where it joins the outer lip, nearer to symphysis than to corner of mouth. A posterior canine generally wanting. Two transverse rows of scales on cheek and two scales below them on posterior part or inferior preopercular limb. Five scales before dorsal. Dorsal spines and rays subequal, somewhat shorter than snout; the membranes between them slightly scalloped. First anal spine very small, second somewhat shorter than third which is about equal to distance between eye and corner of mouth. Anal rays somewhat longer, subequal. Pectorals as long as head without snout. Ventrals equal to snout and eye. Caudal somewhat rounded, the upper and lower lobes produced. Colour of preserved specimens brownish above, lighter below. Belly with two more or less distinct white longitudinal bands. Dorsal and anal vinous red, darker towards the border. Pectorals and ventrals yellowish hyaline. A brown band along base of pectorals. Caudal light vinous red, the lobes darker. Length 367 mm.

Habitat: Singapore; Sumatra (Telokbetong, Benkulen, Trussan, Ulakan, Priaman, Siboga); Batu Islands; Java (Batavia!); Biliton; Borneo (Sandakan); Bali; Celebes (Makassar!, Menado); Limbe Strait; Sulu Islands; Talaut Islands!; Buru; Ceram; Halmahera; Ternate; Banda!; Timor; Aru Islands; New Guinea. — Mauritius, Red Sea, Bombay, Madras, Pondichéry, Andamans, China, Riu Kiu Islands, Formosa, Philippines, Pelew Islands, Solomon Islands, Kingsmill Islands, New Hebrides, Fiji, Samoa, Tonga Islands, Tubuai, Society Islands, Marquesas Islands, Fanning Islands, Hawaii. In sea.

Note. This is a very variable species, at least judging after preserved specimens. The colour can be light or dark brown, without any markings excepting the light bands on belly, which are however not always distinct. *Scarus aeruginosus* C. V. has green teeth according to the original description and can not be this species. Günther (1909, l.c.) describes light bands on the belly of the typical specimens of *balinensis*. For this reason I have united it with *dubius*.

29. **Callyodon oviceps** (C. V.) (Fig. 40, p. 265)

Scarus oviceps Cuvier & Valenciennes, Hist. Nat. Poissons XIV, 1839, p. 244.
Pseudoscarus caudofasciatus Günther, Cat. Brit. Mus. IV, 1862, p. 238. — Fishes of Zanzibar, 1866, p. 108.
Pseudoscarus aeruginosus Kner, Novara Exp. Zool. Theil, Fische 1865—1867, p. 261 (partim).
Pseudoscarus oviceps Guichenot, Mém. Soc. Imp. Sc. Nat. Cherbourg XI, 1865, p. 43.
Pseudoscarus Knerii Steindachner, Sitzber. Akad. Wien XCVI. I. Abth. 1887, p.64.
Callyodon oviceps Jordan & Seale, Bull. Bur. Fish. XXV (1905), 1906, p. 321.
Callyodon zonularis Jordan & Seale, l.c.
Callyodon zonularis Seale & Bean, Proc. U. S. Nat. Mus. XXXIII, 1908, p. 246.
Pseudoscarus caudofasciatus Günther, Fische der Südsee III, 1909, p. 312.
Pseudoscarus oviceps Günther, l.c.
Pseudoscarus Knerii M. Weber, Siboga Exp. Fische 1913, p. 386.
Callyodon caudofasciatus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 446.
Callyodon oviceps Fowler & Bean, ibid. p. 452.
Callyodon caudofasciatus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 381.
Callyodon oviceps Fowler, ibid. p. 382.

D. IX. 10 (11). A. III. 9 (10). P. 2. 12 (13). V. I. 5. Ll. 16 + 5 or 19 + 6. Ltr. $\begin{array}{c}1\frac{1}{2}\\ \hline 1\\ \hline 6-7\end{array}$.

Height 2.8—3.1, 3.5—3.6 in length with caudal. Head 2.9—3.1, 3.4—3.6 in length with caudal. Height of head 1.2 in its length. Eye 5.6—6.2, 2.3—2.7 in snout and 1.7—2.2 in slightly convex interorbital space. Lips broad. Inner upper lip well developed; in young specimens its connection with the outer lip is much nearer to symphysis of upper jaw than to corner of mouth, in older specimens about midway. Anterior nostril round with a low rim, posterior nostril oval. Dental plate smooth, of the colour of old ivory. No posterior canines. Two transverse rows of scales on cheek and 2—3 scales on inferior preopercular limb. Six scales before dorsal. Dorsal spines subequal, a little more or less than distance between eye and corner of mouth. Dorsal rays slightly longer. First anal spine small, second shorter than third, which is about as long as dorsal spines. Anal rays somewhat longer. Pectorals equal to head without snout or somewhat longer. Ventrals half diameter of eye longer than snout. Caudal truncate, the lobes produced in adult specimens. Colour of preserved specimens: Head and back reddish brown, this colour sharply defined from the white or creamy sides, the line of demarcation running from corner of mouth along lower border of eye and in a more or less horizontal direction over opercle and sides of body. Back with broad transverse white or creamy bands, running somewhat obliquely forwards and generally continued to where they merge in the light colour of the sides. The first from below anterior dorsal spines may be wanting, the second about below the 7th—9th dorsal spines, the third about below 3rd—5th dorsal rays. Longitudinal series of scales of belly generally with median white stripes, more distinct in young ones. Dorsal with a dark upper and front edge. Anal, pectorals, and ventrals yellowish. Caudal yellowish, the lobes browner, sometimes a faint darker vertical bar through middle of fin. Length 356 mm.

Habitat: Celebes (Makassar); Buka Island; Karkaralong Islands!; Sulu Islands!; Buru. — Madagascar?, Zanzibar, Mauritius, Philippines!, Pelew Islands, Solomon Islands, New Hebrides, Samoa, Tubuai, Kingsmill Islands, Society Islands, Paumotu Islands, Hawaii. In sea.

30. **Callyodon macrocheilus** (Blkr.)

Scarus macrocheilos Bleeker, Nat. Tijdschr. Ned. Indië VI, 1854, p. 60.
Pseudoscarus macrocheilos Bleeker, Versl. Akad. Amsterdam XII, 1861, p. 237. — Atl. Ichth. I, 1862, p. 38.

Pseudoscarus macrochilus Günther, Fishes of Zanzibar 1866, p. 106.
Callyodon macrocheilus Seale, Occas. Papers B. P. Bishop Mus. IV, 1906, p. 60.
Callyodon macrocheilos Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 385.

D. IX. 10 (11). A. III. 9 (10). P. 2. 13. V. I. 5. Ll. 25.

Height 3, 3.5 in length with caudal. Head 3.2, 3.8 in length with caudal. Height of head 1.2 in its length. Eye 4, about 1.5 in snout and equal to interorbital space. Nostrils minute. Lips broad, covering the dental plates, which are pinkish. Inner upper lip well developed. No posterior canines. Two transverse series of scales on cheek and a third one on inferior preopercular limb. Dorsal spines and rays subequal, about equal to snout. Anal as deep as dorsal. Pectorals about equal to head without snout. Ventrals somewhat shorter. Caudal truncate. Head and fins without bands. Head, anterior part of back and front portion of dorsal violet, rest of body and fins yellowish. Upper and lower edges of the caudal violet. Length 111 mm. (After Bleeker not seen by me.)

Habitat: Halmahera. — Zanzibar, New Hebrides. In sea.

31. **Callyodon ghobban** (Forsk.)

Scarus ghobban Forskål, Descript. Animalium 1775, p. 28.
Scarus pyrrostethus Richardson, Rep. Ichth. China. Rep. 15th Meeting Brit. Ass. Adv. Sc. 1846, p. 262.
Scarus harid Bleeker, Verh. Bat. Gen. XXII, 1849. Gladsch. Labr. p. 48 (nec Forsk.).
Scarus psittacus Cantor, Journ. Asiat. Soc. Bengal XVIII, 1850, p. 1221 (nec Forsk.).
Scarus psittacus Bleeker, Nat. Tijdschr. Ned. Indië IV, 1853, p. 495 (nec Forsk.).
Scarus haridoïdes Bleeker, ibid. VIII, 1855, p. 344.
Pseudoscarus pyrrhostethus Bleeker, Versl. Akad. Amsterdam XII, 1861, p. 239. — Atl. Ichth. I, 1862, p. 42.
Pseudoscarus Cantori Bleeker, ibid. p. 240. — ibid. p. 43.
Pseudoscarus pyrrhostethus Günther, Cat. Brit. Mus. IV, 1862, p. 223.
Pseudoscarus pyrrhostethus Kner, Novara Exp. Fische I, 1865, p. 260.
Pseudoscarus pyrrhostethus Guichenot, Mém. Soc. Imp. Sc. Nat. Cherbourg XI, 1865, p. 46.
Pseudoscarus ghobban Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 563.
Pseudoscarus ghobbam Day, Fishes of India, Prt. 3, 1877, p. 412.
Pseudoscarus pyrrhostethus Günther, Fische der Südsee III, 1909, p. 308.
Pseudoscarus cantori Bean & Weed, Proc. U. S. Nat. Mus. XLII, 1912, p. 608.
Callyodon ghobban Fowler, Mem. B. P. Bishop Mus. X. 1928, p. 388.

D. IX. 10 (11). A. III. 9. P. 2. 13. V. I. 5. Ll. 18 + 7. Ltr. $\begin{array}{c}1\frac{1}{2}\\ \hline 1\\ \hline 6-7\end{array}$.

Height 2.9—3.1, 3.5—3.7 in length with caudal. Head 3—3.3, 3.7—3.9 in length with caudal. Height of head 1.2 in its length. Eye 5.9—6.9, 2.5—2.8 in snout and 1.8—2.3 in somewhat convex interorbital space. Lips rather broad. Inner upper lip rather broad, its connection with the outer lip about midway between rictus and symphysis of upper jaw. Nostrils rather close together, the anterior one with a low rim. Dental plate white. Generally no posterior canines. Two transverse rows of scales on cheek and 1—3 scales on inferior preopercular limb. Six scales before dorsal. Dorsal spines subequal, as long as distance between corner of mouth and eye or somewhat longer. Dorsal rays slightly longer. Soft anal similar to soft dorsal. Pectorals more than half length of snout shorter than head. Ventrals about half diameter of eye longer than postorbital part of head. Caudal truncate, the lobes scarcely produced. Colour of preserved specimens reddish or greenish, scales of body and tail with more or less distinct lighter round spots, often obsolete. Bluish bands radiate from eye, one to corner of mouth. A similar band on upper lip and on lower lip and a short one below it on chin. Also spots of the same colour on sides of head. These bands and spots disappear generally completely after long preservation. Dorsal with a dark edge and generally with a row of dark round spots. Anal with a dark edge. Caudal uniform or with traces of vertical rows of spots. Upper pectoral rays somewhat darker than rest of fin. Ventrals uniform. Colour of a fresh specimen: Deep purple bronze above, belly salmon coloured. Each scale of back and sides verditer blue in its centre; on those of the lower sides the spots are smaller and they are absent on the lower scales of the belly. Head purplish bronze, deep salmon coloured below. A verditer blue band along upper lip, from there continued to below eye and further back to end of preopercle. Some short bands radiating from hinder and upper border of eye. A band from upper anterior border of eye running over snout and joining that of the other side. Some spots on preopercle, all verditer blue. Scales at base of caudal orange. Caudal also tinged with orange, the upper and lower rays verditer blue, the median rays with two rows of verditer blue spots, one along the edge. Dorsal with a verditer blue edge. Spines and rays also partly blue, rest of fin pinkish. Anal light pinkish with a basal and a marginal verditer blue band. Pectorals light yellowish, the superior rays verditer blue. Ventrals also light yellowish, the spine and the first ray verditer blue. Teeth light yellowish brown. Length 401 mm.

Habitat: Pulu Weh!; Singapore; Sumatra (Padang!, Kauer, Benkulen, Telokbetong); Nias!; Java (Batavia!; Prigi); Duizend Islands; Borneo (Bontang); Celebes (Makassar!, Menado); Sula Islands!; Batjan; Ambon; Banda!; Timor; Kei Islands!; Aru Islands!; New Guinea (Moresby Bay). — Madagascar!, Zanzibar, Seychelles Mauritius, Red Sea, Arabian Sea, Coasts of British India, Ceylon, Indochina, Malay Peninsula, China, Riu Kiu Islands, Coast of Queensland, Lord Howe Island, Ponapé, Faté, Rarotonga, Tahiti. In sea.

Note. I have followed Günther, Klunzinger, and Day in uniting *pyrrhostethus* and *cantori* with *ghobban*. Dr. J. Verwey however, who had the opportunity to study many specimens, when he was Director of the Marine Laboratory at Batavia, tells me that these two species can easily be recognised when alive, as the blue spots in *pyrrhostethus* are arranged in vertical bands on the body, whereas they are more irregularly spread in *cantori*. I do not think that these differences suffice to separate the species. Possibly they are of a sexual character.

32. **Callyodon fasciatus** (C. V.)

Scarus fasciatus Cuvier & Valenciennes, Hist. Nat. Poissons XIV, 1839, p. 222.
Scarus rivulatus Cuvier & Valenciennes, ibid. p. 223.
Scarus rivulatoïdes Bleeker, Verh. Bat. Gen. XXII, (1847) 1849. Gladsch. Labr. p. 55.
Scarus micrognathos Bleeker, ibid. p. 56.
Pseudoscarus rivulatus Bleeker, Versl. Akad. Amsterdam XII, 1861, p. 240. — Atl. Ichth. I, 1862, p. 44.
Pseudoscarus rivulatus Günther, Cat. Brit. Mus. IV, 1862, p. 222.
Pseudoscarus rivulatus Day, Fishes of India, Prt. 3, 1877, p. 413.
Pseudoscarus rivulatus Macleay, Descr. Cat. Austr. Fish. II, 1881, p. 101.
Callyodon fasciatus Jordan & Seale, Bull. Bur. Fish. XXV, (1905) 1906, p. 328.
Scarus fasciatus Whitley, Austr. Zoologist IV, Prt. IV, 1926, p. 232.
Callyodon fasciatus Fowler & Bean, Proc. U. S. Nat. Mus. LXXI, Art. 10, 1927, p. 10. — Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 429.
Callyodon fasciatus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 379.
Callyodon fasciatus Chevey, Travaux Inst. Océan. Indochine. Mem. IV, 1932, p. 107.
Callyodon fasciatus Fowler, Proc. Acad. Nat. Sc. Philadelphia LXXXVI, 1934, p. 155. — ibid. LXXXVII (1935), 1936, p. 158. — Acad. Nat. Sc. Philadelphia, Monogr. 2, 1938, p. 114.

D. IX. 10. A. III. 9. P. 2.12—13. V. I. 5. Ll. 18 + 7. Ltr. $\begin{array}{c} 1\frac{1}{2} \\ \hline 1 \\ \hline 6 \end{array}$.

Height 2.4—2.8, 2.9—3.5 in length with caudal. Head 2.8—3, 3.4—3.7 in length with caudal. Height of head equal to its length. Eye 7.7—7.8, 3.4—3.5 in snout and 2.6—2.9 in convex interorbital space. Lips rather broad, covering greater part of dental plate. Inner upper lip very short, its connection with the outer lip much nearer to rictus than to symphysis of upper jaw. Anterior nostril with a low rim, posterior one round, with a very short anterior flap. Dental plate yellowish. Two transverse rows of scales on cheek, the lower one consisting of 6 scales. A third row of 1—2 scales on posterior part of inferior preopercular limb. Six to seven scales before dorsal. Dorsal spines subequal, about twice eye. Dorsal rays slightly longer. Third anal spine as long as dorsal spines. Soft anal somewhat less deep than dorsal. Pectorals about half length of snout shorter than head. Ventrals equal to snout and eye. Caudal truncate, the lobes slightly produced. Colour of preserved specimens reddish brown or yellowish olive. Most scales of body with a longitudinal light band, narrowly bordered by darker. Head reddish brown or purple above. Snout, sides and underpart of head pinkish with numerous anastomosing and meandering yellow bands, narrowly bordered with dark. These bands broader on lips and chin. Upper part of head with some similar short stripes. Dorsal creamy with a pinkish terminal longitudinal band, bordered below with a dark line. A more or less distinct yellowish dark edged blotch between each of the posterior rays. Anal greenish or yellowish basally, the outer half lighter, separated from the basal part by a narrow dark longitudinal stripe. Caudal reddish, the lobes somewhat darker. Sometimes longitudinally elongate dark edged yellow blotches in two vertical rows are present on this fin. Pectorals pinkish or yellowish, the first and second branched rays as well as the base of the fin purplish; sometimes this purple band is broken up into elongate blotches and round spots, edged with darker purple. Ventrals yellow, spine and first ray more orange. Length 350 mm.

Habitat: Singapore; Biliton; Java (Batavia!); Bawean; Celebes (Makassar); Sulu Islands; Sumbawa; Batjan; Ambon; Timor. — Coast of British India, Andamans, Siam, Indochina, China, Riu Kiu Islands, Philippines!, New Hebrides, Coast of Queensland, Society Islands, Paumotu Islands. In sea.

Note. Whitley l.c. doubts the identity of *fasciatus* C. V. and *rivulatus* C. V. but Bleeker, Atl. Ichth. l.c., says that he has seen the types of both and that they belong to the same species.

33. **Callyodon dussumieri** (C. V.)

Scarus Dussumieri Cuvier & Valenciennes, Hist. Nat. Poissons XIV, 1839, p. 252.
Scarus Dussumieri Bleeker, Nat. Tijdschr. Ned. Indië IV, 1853, p. 494.
Pseudoscarus Dussumieri Bleeker, Versl. Akad. Amsterdam XII, 1861, p. 241. — Atl. Ichth. I, 1862, p. 46.
Pseudoscarus dussumieri Günther, Cat. Brit. Mus. IV, 1862, p. 224.
Pseudoscarus Dussumieri Guichenot, Mém. Soc. Imp. Sc. Nat. Cherbourg XI, 1865, p. 47.
Pseudoscarus dussumieri Day, Fishes of India, Suppl. 1888, p. 804.
Pseudoscarus dussumieri Günther, Fische der Südsee III, 1909, p. 309.
Callyodon dussumieri Jordan & Richardson, Mem. Carnegie Mus. IV, No. 4, 1902, p. 196.
Callyodon dussumieri Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 449.

D. IX. 10 (11). A. III. 9. P. 2.12. V. I. 5. Ll. 19 + 6. Ltr. $\begin{array}{c} 1\frac{1}{2} \\ \hline 1 \\ \hline 6-7 \end{array}$.

Height 2.6, 3.2, in length with caudal. Head 2.9, 3.5 in length with caudal. Eye 8.2, 3.7 in snout and 2.8 in convex interorbital space. Lips broad, covering greater part of dental plate. Inner upper lip well developed, its connection with the outer lip much nearer symphysis of upper jaw than to corner of mouth. Nostrils small, the anterior one with a low rim. Dental plate white, smooth. A strong canine posteriorly in upper and in lower jaw. Two rows of scales on cheek and a third one, consisting of 3 scales, on inferior preopercular limb. Five or six scales before dorsal. Dorsal spines and rays subequal, the last rays somewhat longer. First dorsal spine scarcely as long as distance between eye and corner of mouth. Anal similar to dorsal. Pectorals half length of snout shorter than head. Ventrals equal to head without snout. Caudal slightly rounded, the lobes somewhat produced. Colour of preserved specimen greenish olive, sides, lower side of head, and thorax lighter. Interopercle and distal part of opercle with a pinkish hue. Lips broadly yellowish. A faint yellowish band from corner of mouth to lower side of eye. Streaks of the same colour radiating from eye posteriorly and anteriorly. A yellowish spot behind eye, above the posterior streak. The anterior streak not continued so far on snout as to meet that of the other side in my specimen, but this may happen according to Bleeker. A third streak from superior border of eye and running forwards to meet that of the other side may be present according to Bleeker. Dorsal pinkish, with a yellow marginal band. Anal similar, but the marginal band broader. Pectorals pinkish, with a median longitudinal dusky band. Ventrals pinkish, the spine yellowish orange. Caudal lobes and basal part of median rays darker, with a purplish hue, distal part of median rays creamy white. Length 402 mm.

Habitat: Singapore; Nias!; Java (Batavia, Patjitan); Tomahu Island at north end of Buru; Talisse Island. — Madagascar, Zanzibar, Red Sea, Seychelles, Réunion, Persian Gulf, Coast of Burma, Formosa, Philippines, Ponapé, New Hebrides, Fanning Islands. In sea.

34. **Callyodon blochi** (C. V.)

Scarus viridis Bloch, Ausländ. Fische IV, 1790, p. 29 (nec Bonnaterre).
Scarus Blochii Cuvier & Valenciennes, Hist. Nat. Poissons XIV, 1839, p. 219.
Scarus Quoyi Cuvier & Valenciennes, ibid. p. 273.
Scarus chrysopomus Bleeker, Nat. & Geneesk. Arch. Ned. Indië IV (2), 1847. p. 163. — Verh. Bat. Gen. XXII, 1849. Gladsch. Labr. p. 53.
Pseudoscarus viridis Bleeker, Versl. Akad. Amsterdam XII, 1861, p. 240. — Atl. Ichth. I, 1862, p. 45.
Pseudoscarus chrysopoma Günther, Cat. Brit. Mus. IV, 1862, p. 221.
Pseudoscarus viridis Guichenot, Mém. Soc. Imp. Sc. Nat. Cherbourg XI, 1865, p. 33.
Pseudoscarus chrysopoma Day, Fishes of India, Prt. 3, 1877, p. 412.
Pseudoscarus viridis Peters, Monatsber. Akad. Berlin 1876, p. 843.
Callyodon blochi Jordan & Seale, Bull. Bur. Fish. XXV, (1905) 1906, p. 326.
Callyodon hadji Seale, Philip. Journ. Sc. IV, No. 6, 1909, p. 525.
Pseudoscarus chrysopoma Günther, Fische der Südsee III, 1909, p. 307.
Callyodon philippinus Fowler, Proc. Acad. Nat. Sc. Philadelphia LXX, 1918, p.66.
Callyodon blochii Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 462.
Callyodon blochii Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 384.
Callyodon chrysopomus P. J. Schmidt, Trans. Pac. Comm. Acad. Sc. USSR 1, 1930, p. 94.
Scarus blochii Herre, Notes Fishes Zool. Mus. Stanford Univ. 1931, p. 78.

D. IX. 10 (11). A. III. 9. P. 2. 12 (13). V. I. 5. Ll. 23—24. Ltr. $\begin{array}{c} 1\frac{1}{2} \\ \hline 1 \\ \hline 7 \end{array}$.

Height 2.6—2.7, 3.2—3.3 in length with caudal. Head 2.9—3, 3.6—3.7 in length with caudal. Height of head 1.1—1.2 in its length. Eye 6—6.4, 2.5—2.6 in snout and 2.1—2.2 in convex interorbital space. Lips rather broad, but sometimes the border of the lower lip is vertical, leaving a great part of the lower dental plate uncovered. Inner upper lip generally short, its connection with the outer lip nearer corner of mouth than symphysis of upper jaw. Anterior nostril with a low rim, posterior nostril an oblique slit.

Teeth white or yellowish. One, two, or three posterior canines in the upper jaw and one in the lower jaw. Two transverse rows of scales on the cheek and a third row of 2 scales on inferior preopercular limb. Five or six scales before dorsal. Dorsal spines subequal, twice diameter of eye. Soft dorsal not higher than spinous part. Third anal spine about three fourths of first anal ray. Anal somewhat less deep than dorsal. Pectorals about half length of snout shorter than head. Ventrals slightly pointed, equal to eye and snout together. Caudal truncate or slightly rounded, the upper and lower lobes slightly produced. Colour of preserved specimens reddish brown, lighter below and on caudal peduncle. Scales of back and sides often lighter in the middle. Upper lip yellow, this colour continued as a stripe from corner of mouth to below and behind eye. Region below this stripe generally with larger or smaller yellow patches, as if the stripe had been made with wet paint and the colour had trickled down in drops. This patch connected with that of the other side along lower lip and across chin. Markings of the same colour as stripes, curved lines, or spots on interopercle and inferior preopercular limb. Subopercle often with a yellow hindborder. Short yellow streaks from anterior and posterior border of eye. Dorsal dusky with lighter marginal and basal longitudinal bands, separated from the median dusky part by narrow dark lines. Sometimes a dark longitudinal band on the median dusky part. Anal light violet or pinkish basally, yellowish distally, the two colours separated by a narrow dark line. Pectorals yellowish, the third to fifth or sixth rays and their membranes dusky or more or less purplish, forming a broad streak along the whole length of the fin. Ventrals yellowish, the spine lighter and the first ray generally darker. Caudal dusky at base, lighter and yellowish distally, the lobes somewhat darker. Length 291 mm. (Type of *C. hadji* examined).

Habitat: Singapore; Nias!; Sumatra (Trussan, Ulakan, Priaman, Siboga); Biliton; Java (Batavia); Duizend Islands; Bawean; Celebes (Makassar, Menado); Sulu Islands!; Ambon; New Guinea (Port Moresby). — Mauritius, Réunion, Coasts of British India, Siam, Riu Kiu Islands, Philippines!, Pelew Islands, New Hanover, New Ireland, New Hebrides, New Caledonia, Society Islands, Paumotu Islands. In sea.

35. **Callyodon sordidus** (Forsk.)

Scarus sordidus Forskål, Descript. Animalium 1775, p. 30.
?*Scarus nigricans* Cuvier & Valenciennes, Hist. Nat. Poissons XIV, 1839, p. 213.
?*Scarus mentalis* Cuvier & Valenciennes, ibid. p. 233.
Scarus variegatus Cuvier & Valenciennes, ibid. p. 256.
?*Scarus chlorodon* Jenyns, Zool. Voyage Beagle 1842, p. 105.
Scarus Troschelii Bleeker, Nat. Tijdschr. Ned. Indië IV, 1853, p. 498.
Scarus celebicus Bleeker, ibid. VII, 1854, p. 253.
Pseudoscarus Troscheli Bleeker, Versl. Akad. Amsterdam XII, 1861, p. 232. — Atl. Ichth. I, 1862, p. 25.
Pseudoscarus celebicus Bleeker, l.c. — ibid. p. 26.
Pseudoscarus celebicus Günther, Cat. Brit. Mus. IV, 1862, p. 237.
Pseudoscarus variegatus Guichenot, Mém. Soc. Imp. Sc. Nat. Cherbourg XI, 1865, p. 49.
Pseudoscarus troscheli Günther, Fishes of Zanzibar 1866, p. 108.
Pseudoscarus sordidus Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 568.
Pseudoscarus sordidus Day, Fishes of India, Prt. 3, 1877, p. 413.
Pseudoscarus Troschelii, var. *flavoguttata* Steindachner, Sitzber. Akad. Wien XCVI, Bd. I, (1887) 1888, p. 63.
Pseudoscarus variegatus Sauvage, Poissons de Madagascar 1891, p. 472.
Scarus celebicus Seale, Occas. Papers B. P. Bishop Mus. I, 1901, p. 95.
Pseudoscarus sordidus Steindachner, Denkschr. Akad. Wien LXXI, 1902, p. 150.
Pseudoscarus troschelii Jordan & Evermann, Bull. U. S. Fish Comm. XXIII, (1903), 1905, p. 358.
Callyodon pyrrhurus Jordan & Seale, Bull. Bur. Fish. XXV, (1905) 1906, p. 314.
Callyodon abacurus Jordan & Seale, ibid. p. 324.
Callyodon cyanogrammus Jordan & Seale, ibid. p. 330.
Callyodon rostratus Seale, Philip. Journ. Sc. IV. N° 6, 1909, p. 524 (nec Gthr.).
Pseudoscarus troschelii Günther, Fische der Südsee III, 1909, p. 328.
Pseudoscarus abacurus Günther, ibid. p. 329.
Pseudoscarus Troscheli M. Weber, Siboga Exp. Fische 1913, p. 388.
Callyodon sordidus Fowler & Bean, Proc. U. S. Nat. Mus. LXXI, Art. 10, 1927, p. 10. — Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 398 (sine syn.).
Callyodon celebicus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 373.
Callyodon sordidus Fowler, ibid. p. 374.
Scarus abacurus Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 336.
Scarus troscheli Herre, ibid. p. 339.
Callyodon sordidus Fowler, Acad. Nat. Sc. Philadelphia, Monogr. 2, 1938, p. 112, p. 204.

D. IX. 10 (11). A. III. 9—10. P. 2. 13. V. I. 5. Ll. 17—18 + 6.

Ltr. $\dfrac{1\frac{1}{2}}{\dfrac{1}{6-7}}$.

Height 2.6—2.9, 3.1—3.4 in length with caudal. Head 2.5—2.7, 3—3.2 in length with caudal. Height of head 1.2 in its length. Eye 7.6—8.1, 3.2—3.3 in snout and 2.3—2.7 in the somewhat convex interorbital space. Lips narrow, leaving greater part of dental plate uncovered. Inner upper lip poorly developed, its connection with the outer lip somewhat nearer to corner of mouth than to symphysis of upper jaw. Dental plate greenish or yellowish, the cutting edge crenulated. Posterior canines present or absent. Nostrils moderate, the anterior with a low rim. Two rows of scales on cheek, preopercular limb broadly naked. Three to five scales before dorsal. Dorsal spines and rays subequal, about equal to distance between eye and corner of mouth. Anal similar to dorsal. Caudal truncate or slightly rounded, the lobes sometimes slightly produced. Pectorals half length of snout or more shorter than head. Ventrals about equal to snout. Colour of preserved specimens from light yellowish to dark olive or reddish brown; caudal peduncle sometimes lighter. Scales of body often with a dark centre, rarely with transverse dark bands. Snout and postocular region often darker and contrasting with the light cheek. A yellow band may be present along upper lip and below lower lip, and also a yellow band from corner of mouth to eye and a few short yellow stripes radiating from posterior border of eye. Dorsal generally with a yellowish, reddish, or violet edge, separated below from rest of fin by a narrow dark line. Sometimes the base of the fin has the same colour as the edge, and a median part remains as a longitudinal band, which may be broken into spots on posterior part of fin or it may be double here, with anastomosing branches between the two parts. Anal generally yellow or reddish with the basal part bluish or violet, the two colours generally well defined. Caudal yellowish or reddish, the outer rays sometimes slightly darker. Sometimes some irregular light spots on the rays. Pectorals more or less yellow, the distal part of the lower rays generally hyaline, the upper rays with irregular brownish or reddish streaks, giving to the fin a mottled appearance. Ventrals light in the light specimens, dark in the dark ones, almost uniform or with the rays darker than the membranes. Length 973 mm. (Type of *C. rostratus* Seale examined.)

Habitat: Java (Batavia!); Duizend Islands!; Celebes (Makassar, Kait Point, Libani Bay); Binang Unang Island; Sulu Islands!; Saleyer!; Gisser!; Timor!; Banda!; New Guinea. — Red Sea, Sokotra, Zanzibar, Muscat, Mauritius, Coasts of British India, Andamans, China, Riu Kiu Islands, Philippines, Guam, Solomon Islands, New Hebrides, Fiji, Samoa, Funafuti, Society Islands, Christmas Island, Paumotu Islands, Kingsmill Islands, Hawaii. In sea (Fowler & Bean l.c. record a specimen from fresh water!).

36. **Callyodon margaritus** (Cart.)

Pseudoscarus margaritus Cartier, Verh. phys. med. Ges. Würzburg V, 1874, p. 105.
Callyodon albipunctatus Seale, Philip. Journ. Sc. IV, 1909, p. 526.
Callyodon muricatus Fowler & Bean, Proc. U. S. Nat. Mus. LXII, 1922, p. 52 (nec C. V.).
Callyodon margaritus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 397.
Callyodon margaritus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 374.

D. IX. 10 (11). A. III. 9. P. 2. 12. V. I. 5. Ll. 17 + 7 or 19 + 5. Ltr. $\dfrac{1\frac{1}{2}}{\dfrac{1}{6-7}}$.

Height 2.9, 3.5 in length with caudal. Head 2.6, 3.1 in length with caudal. Height of head 1.3 in its length. Eye 6.1, 2.8 in snout and twice in almost flat interorbital space. Lips narrow. Dental plate, which is yellowish green, greatly exposed. Connection of inner upper lip with outer lip in the middle between rictus and symphysis of upper jaw, or nearer to rictus. Nostrils small, the anterior with a low rim, the posterior oval. Two rows of scales on cheek, the lower one consisting of 6 scales. Preopercular limb broadly naked. Four scales before dorsal. Dorsal spines subequal, equal to distance between rictus and eye. Spinous and soft part of dorsal of equal height. Third anal spine as long as dorsal spines. Soft anal similar to soft dorsal. Pectorals as long as head without snout. Ventrals slightly longer than eye and snout together. Caudal truncate. Colour of preserved specimens greyish. Surrounding of mouth orange. Scales of anterior part of body each with a larger or smaller brown or reddish spot. Two rows of pearly white distant spots, each about one scale in size, on posterior part of body and tail. Some other scales with a spot of the same colour. Fins hyaline, with a pinkish hue. Ventrals with a bluish hue. Length 256 mm. (Description made after the type of *C. albipunctatus,* examined by me.)

Habitat: Sulu Islands!; Celebes (Kait Point, Libani Bay); New Guinea. — Philippines, Guam ?. In sea.

Note. In colouration this species is very much like young specimens of *C. rubroviolaceus*. In lastnamed species there are however a few scales on the preopercular limb.

Two young specimens from Guam in the collections of the Bureau of Science, Manila, probably belong to this species.

37. **Callyodon oktodon** (Blkr.)

Pseudoscarus oktodon Bleeker, Versl. Akad. Amsterdam XII, 1861, p. 235. — Atl. Ichth. I, 1862, p. 33.
Pseudoscarus octodon Kner, Novara Exp. Fische I, 1865, p. 262.
Pseudoscarus octodon Günther, Fische der Südsee III, 1909, p. 327.
Callyodon oktodon Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 376.
Callyodon octodon, P. J. Schmidt, Trans. Pac. Comm. Acad. Sc. USSR I, 1930, p. 93.

D. IX. 10 (11). A. III. 9. P. 2. 12. V. I. 5. Ll. 18 + 7. Ltr. $\begin{array}{c}1\frac{1}{2}\\ \hline 1\\ \hline 6\end{array}$.

Height 2.6, 3.2 in length with caudal. Head 2.8, 3.4 in length with caudal. Height of head equal to its length. Lips broad, covering the greater part of the dental plate. Nostrils rather small, the anterior one with a low rim. Dental plate dirty greenish. Two canines posteriorly in upper and lower jaw. Two rows of scales on cheek, the lower one slightly intruding on inferior preopercular limb, which otherwise is broadly naked. Four scales before dorsal. Dorsal spines subequal, about equal to distance between rictus and eye. Soft dorsal slightly lower than spinous part. Anal deeper than dorsal, both fins pointed behind. Pectorals more than half length of snout shorter than head. Ventrals equal to head without snout. Caudal truncate, the lobes somewhat produced. Colour of preserved specimen dark brown, snout somewhat lighter, with a pinkish hue. A dark bluish band above upper lip continued to eye. Lower lip with a bluish band followed by another at some distance behind it, crossing the chin, and a less distinct longitudinal one on interopercle. Dorsal dark brown, with a still darker bluish edge and a median dark band in its posterior part. Anal reddish brown with a dark bluish edge and with a large dark bluish diffuse spot on the membranes between each spine and ray, forming a median band on the fin. Caudal dark brown with a vertical dark bluish band, nearer its base than its edge. Length 326 mm.

Habitat: East Java!; Buton. — Zanzibar, Riu Kiu Islands, Philippines, Pelew Islands, Yap, Society Islands. In sea.

Note. Kner records this species from Sidney but this locality is certainly erroneous (see McCulloch, Austr. Zoologist II, Prt. III, 1922, p. 100).

38. **Callyodon rhoduropterus** (Blkr.)

Pseudoscarus rhoduropterus Bleeker, Versl. Akad. Amsterdam XII, 1861, p. 233. — Atl. Ichth. I, 1862, p. 27.
Scarus rhodopterus Herre, Notes Fish Zool. Mus. Stanford Univ. 1931, p. 79.

D. IX. 10 (11). A. III. 9. P. 2. 13. V. I. 5. Ll. 18—19 + 6—8. Ltr. $\begin{array}{c}1\frac{1}{2}\\ \hline 1\\ \hline 6-7\end{array}$.

Height 2.8, 3.4 in length with caudal. Head 2.6, 3.2 in length with caudal. Height of head 1.1 in its length. Eye 6.6, 2.7 in snout and twice in somewhat convex interorbital space. Lips narrow, leaving the greater part of the dental plate uncovered. Inner upper lip poorly developed, its connection with the outer lip much nearer to corner of mouth than to symphysis of upper jaw. Dental plate dirty brownish without green hue. One or two strong canines posteriorly in the upper jaw. Nostrils moderate, the anterior one with a low rim. Two rows of scales on cheek, inferior preopercular limb naked. Three scales before dorsal. Dorsal spines and rays subequal, as long as distance between eye and corner of mouth. Anal as deep as dorsal. Pectorals equal to head without snout. Ventrals half diameter of eye shorter. Caudal truncate, the lobes scarcely produced. Colour of preserved specimens yellowish brown; tail, sides of snout and underside of head lighter. Five broad transverse reddish brown bands on body, the first at origin of dorsal, the second below 4th—6th dorsal spines, the third below 1st—3rd dorsal rays and running to anus and anterior part of anal, the fourth below 5th—7th dorsal rays to median part of base of anal, and the fifth which is rather faint, between end of dorsal and anal. Many scales of body and tail with a dark brown spot. Dorsal and anal reddish brown, with a darker edge. Anterior rays of pectoral and basal half of other rays brown, the distal part yellowish hyaline. Ventrals dark reddish brown. Caudal light yellowish, the outer upper and lower rays darker. Length 253 mm.

Habitat: Celebes (Makassar). — Philippines! In sea.

Note. Bleeker described this species after a single specimen long 180 mm. A second specimen long 195 mm has been recorded by Herre from the Philippines, and a third specimen, also from the Philippines and belonging to the collections of the Bureau of Science, Manila, is described here.

This species is very close to *C. sordidus,* as has already been remarked by Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 400. Specially those specimens of *sordidus* which show transverse bands, approach *rhoduropterus* but they differ from lastnamed species by the greenish colour of the dental plate.

39. **Callyodon cyanotaenia** (Blkr.)

Scarus cyanotaenia Bleeker, Nat. Tijdschr. Ned. Indië VI, 1854, p. 197.
Pseudoscarus cyanotaenia Bleeker, Versl. Akad. Amsterdam XII, 1861, p. 233. — Atl. Ichth. I, 1862, p. 28.
Callyodon cyanotaenia Ogilby, Mem. Queensl. Mus. III, 1915, p. 135.

D. IX. 10 (11). A. III. 9 (10). P. 2. 13. V. I. 5. Ll. 25.

Height about 3.1, 3.4 in length with caudal. Head 2.9, 3.2 in length with caudal. Height of head 1.3 in its length. Eye 5, 2.5 in snout and 1.5 in interorbital space. Nostrils very small. Lips narrow. Dental plate pinkish. A canine posteriorly in the upper jaw. Two rows of scales on cheek, inferior preopercular limb naked. Dorsal spines and rays subequal, about equal to distance between rictus and eye. Anal scarcely less deep than dorsal. Pectorals more than half length of snout shorter than head. Ventrals about equal to postorbital part of head. Caudal slightly rounded, the lobes scarcely produced. Red, scales of back and body with a darker centre. A blue transverse band on chin. Caudal red, violet towards its end. Dorsal and anal red, with a blue edge and a blue basal longitudinal band, the dorsal moreover with a median longitudinal blue band. Pectorals orange, with a dark spot superiorly at their base. Ventrals red. Length 210 (After Bleeker, not seen by me).

Habitat: Java (Batavia). — Queensland.

Note. This species is only known from the type and from 3 specimens recorded but not described by Ogilby from Queensland.

40. **Callyodon erythrodon** (C. V.)

Scarus erythrodon Cuvier & Valenciennes, Hist. Nat. Poissons XIV, 1839, p. 255.
Scarus sumbawensis Bleeker, Journ. Ind. Arch. I, No. IX, 1848, p. 638.
Scarus gymnognathus Bleeker, Nat. Tijdschr. Ned. Indië IV, 1853, p. 498.
Pseudoscarus gymnognathus Bleeker, Versl. Akad. Amsterdam XII, 1861, p. 242. — Atl. Ichth. I, 1862, p. 28.
Pseudoscarus sumbawensis Bleeker, ibid. p. 242. — ibid. p. 47.
Pseudoscarus sumbawensis Günther, Cat. Brit. Mus. IV, 1862, p. 232.

Pseudoscarus erythrodon Guichenot, Mém. Soc. Imp. Sc. Nat. Cherbourg XI, 1865, p. 49.
Pseudoscarus erythrodon Günther, Fishes of Zanzibar 1866, p. 107.
Pseudoscarus erythrodon Day, Fishes of India, Prt. 3, 1877, p. 413.
Pseudoscarus Goldiei Macleay, Proc. Linn. Soc. New S. Wales VII, 1882, p. 590.
Pseudoscarus erythrodon Sauvage, Poissons de Madagascar 1891, p. 470.
Pseudoscarus sumbawensis Steindachner, Denkschr. Akad. Wien LXX, 1900, p. 509.
?*Pseudoscarus sumbawensis* Seale, Occas. Papers B. P. Bishop Mus. I, 1901, p. 97.
Callyodon erythrodon Jordan & Evermann, Bull. U. S. Fish. Comm. XXIII, (1903) 1905, p. 357.
Callyodon erythrodon Jordan & Seale, Bull. Bur. Fish. XXV, (1905) 1906, p. 317.
Callyodon erythrodon Steindachner, Sitzber. Akad. Wien CXV, 1906, p. 1400.
Pseudoscarus erythrodon Günther, Fische der Südsee III, 1909, p. 319.
Callyodon erythrodon, Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 385.
Callyodon erythrodon Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 372.
Scarus erythrodon Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 331.
Callyodon erythrodon Fowler, Acad. Nat. Sc. Philadelphia, Monogr. 2, 1938, p. 150, p. 176.

D. IX. 10 (11). A. III. 9. P. 2. 13. V. I. 5. Ll. 25.

Height 2.9, 3.3—3.7 in length with caudal. Head 2.8—2.9, 3.1—3.7 in length with caudal. Height of head 1.2 in its length. Eye 4.4—5.6, 2.2 in snout and 1.7 in interorbital space. Nostrils minute. Lips rather broad in young, narrow in adults. Teeth pink. A posterior canine may be present. Inner upper lip poorly developed. Two rows of scales on cheek, inferior preopercular limb naked. Dorsal spines subequal, equal to distance between rictus and eye. Dorsal rays scarcely longer than spines. Anal as deep as dorsal. Pectorals half length of snout shorter than head. Ventrals about equal to postorbital part of head. Caudal somewhat rounded, the lobes slightly produced in adults. Dark brown or purple, centre of scales generally darker. Tail sometimes lighter. Head without bands or with a few narrow green bands above upper lip and on chin. Fins brown or purple, dorsal, anal, and caudal with a more or less distinct dark edge. According to Bleeker young specimens have 4 longitudinal light bands from head to caudal. Length 280 mm (After Bleeker, not seen by me).

Habitat: Batu Islands; Java (Batavia); Celebes (Badjoa, Malibagu Point); Limbe Strait; Binang Unang Island; Sangi Islands; Sulu Islands; Buru; Tidore; Halmahera; Sumbawa; Timor; Banda; New Guinea (Manokwari, Port Moresby). — East Coast of

Africa, Madagascar, Zanzibar, Mauritius, Ceylon, Andamans, Philippines, Pelew Islands, Marianas, Solomon Islands, New Hebrides, Samoa, Cook Islands, Society Islands, Hawaii. In sea.

Note. Günther (1909, l. c.) has already united *gymnognathus* and *sumbawensis* with this species, after having examined typical specimens.

41. **Callyodon bleekeri** nom. novum

Scarus Quoyi Bleeker, Nat. Tijdschr. Ned. Indië IV, 1853, p. 607 (nec C. V.).
Pseudoscarus Quoyi Bleeker, Versl. Akad. Amsterdam XII, 1861, p. 230. — Atl. Ichth. I, 1862, p. 29 (nec C. V.).
Pseudoscarus quoyi Günther, Fische der Südsee III, 1909, p. 319 (nec C. V.).
Callyodon quoyi Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 407 (nec. C. V.).
Callyodon quoyi Fowler, Mem B. P. Bishop Mus. X, 1928, p. 375 (nec C. V.).
Scarus quoyi Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 335 (nec C. V.).

D. IX. 10 (11). A. III. 9 (10). P. 2. 13. V. I. 5. Ll. 15—18 + 8. Ltr. $\begin{array}{c} 1\frac{1}{2} \\ \hline 1 \\ \hline 7 \end{array}$.

Profile of head evenly convex. Height 2.7—2.8, 3.2—3.4 in length with caudal. Head 2.7—2.8, 3.3—3.4 in length with caudal. Height of head 1.1—1.2 in its length. Eye 5.9—7.5, 2.4—3.3 in snout and 1.9—2.5 in convex interorbital space. Lips narrow, the border of the lower lip nearly vertical. Inner upper lip very short, its connection with the outer lip much nearer to rictus than to symphysis of upper jaw. Dental plate yellow. One or two posterior canines in the upper jaw. Two transverse rows of scales on the cheek, each row consisting of 5—7 scales. Preopercular limb naked. Anterior nostril with a low rim, posterior nostril a transverse slit. Five scales before dorsal. Dorsal spines subequal, twice or more than twice diameter of eye. Soft dorsal of same height as spinous part. First anal spine somewhat shorter than second, third longest, twice diameter of eye. Soft anal somewhat deeper than soft dorsal. Pectorals equal to distance between opercular flap and rictus. Ventrals pointed, half diameter of eye longer than postorbital part of head. Caudal truncate, the upper and lower lobes somewhat produced. Colour of preserved specimens yellowish. Each scale of posterior half of body and tail often with a longitudinal oblong pinkish blotch, bordered by darker. Upper and lower lip yellowish or creamy. A yellow rather narrow band from rictus to eye, continued to opercular flap, another similar band from rictus straight to base of pectoral, not always distinct, parallel to the first. The region between these bands with a greenish yellow hue. Hindborder of opercle more or less yellow. A pinkish band above the upper lip continued above the yellow band to eye and following it as far as posterior border of preopercle. A yellowish band again above this pinkish band before eye. A similar band from hindborder of eye obliquely upwards. A pinkish or yellowish band on chin, behind and parallel to that of the lower lip, more or less interrupted in the middle. Dorsal yellowish with a rather broad pinkish or bluish terminal longitudinal band, bordered by a narrow dark line below. A broad median violet longitudinal band on the fin. Anal yellow with a creamy somewhat wavy broad longitudinal band in the middle, bordered above and below by a narrow dark line. First rays of pectorals yellowish orange, following pinkish, rest again yellowish, hyaline towards the extremity. Ventrals yellowish, spine and first ray pinkish. Caudal yellow, upper and lower lobes orange. Length 323 mm.

Habitat: Sumatra (Padang); Ternate. — Philippines!; New Ireland, Ponapé, Solomon Islands, Shortland Island. In sea.

Note. Although Bleeker examined the type of *Scarus quoyi* C. V. in the Paris Museum and stated that it is certainly the same as *blochi*, he retained the name *quoyi* for the species described above. According to the present rules of nomenclature this is not allowed and therefore I propose to call Bleeker's species *bleekeri*.

42. **Callyodon bowersi** Snyder

Callyodon bowersi Snyder, Proc. U. S. Nat. Mus. XXXVI, 1909, p. 602. — ibid. XLII, 1912, p. 509, Pl. 66, fig. 3.

D. IX. 10. A. III. 9. P. 2. 13. V. I. 5. Ll. 17 + 8—9. Ltr. $\begin{array}{c}1\frac{1}{2}\\\hline 1\\\hline 6-7\end{array}$.

Profile of head evenly convex. Height 2.6—2.7, 3.1—3.3 in length with caudal. Head 2.6—2.7, 3.2—3.3 in length with caudal. Height of head 1.1 in its length. Eye 7.1—7.2, 3.1—3.3 in snout and 2.2—2.4 in convex interorbital space. Lips narrow, the border of the lower lip nearly vertical. Inner upper lip very short, its connection with the outer lip much nearer to rictus than to symphysis of upper jaw. Dental plate yellow or dirty greyish. One posterior canine in the upper jaw. Two rows of scales on the cheek, each row consisting of 5—6 scales. Inferior preopercular limb naked. Anterior nostril with a low rim, posterior nostril a small oval or round opening. Four scales before dorsal. Dorsal spines subequal, as long as distance between rictus and eye. Soft dorsal equal in height to the spinous part. Soft anal slightly deeper than soft dorsal. Pectorals equal to distance between opercular flap and rictus. Ventrals half diameter of eye longer than postorbital part of head. Caudal truncate, the upper and lower lobes somewhat produced. Colour of preserved specimens yellowish or reddish. In well preserved specimens the scales of body and tail are green with a large round pink spot at their base. Behind eye a broad light reddish or yellowish band, widening to a very large patch on anterior part of body and covering most of the space between lateral line and base of pectoral, extending to about the 6th scale of the lateral line. Head yellow or reddish with a green hue, apparently the remains of the colour in life. Snout with a large violet patch, bordered anteriorly by a broad yellow or green band, which runs along the upper lip, on the sides by a band of the same colour from rictus to eye, and posteriorly by a similar band connecting the eyes over the anterior part of the interorbital space. A second band may be present behind this last band, sometimes broken into meandering short bands, covering the interorbital space. A violet band may be present running from rictus to below eye, bordering the yellow band mentioned and with a narrow yellow band below it. These band may be continued behind eye and more or less fuse with the large patch behind eye and on sides of body. A double yellow or green band on chin, the anterior one bordering the lower lip. Dorsal pink with a broad terminal and a narrower median and basal longitudinal green band. Anal green with a broader or narrower pink median longitudinal band. Caudal with longitudinal streaks, some rays being pink, others green. Pectorals pink, the upper rays greenish. Ventrals pink or yellowish, the outer rays sometimes darker. Length 300 mm.

Habitat: Java (Batavia!). — Riu Kiu Islands, Philippines! In sea.

Note. This species is close to *bleekeri,* but differs in having an other colour pattern. It has been wrongly united with *sordidus* by Fowler & Bean (Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 398).

43. **Callyodon mutabilis** Gray

Callyodon mutabilis Gray, Cat. Fish. Gronow. 1854, p. 86.
Pseudoscarus pentazona Bleeker, Versl. Akad. Amsterdam XII, 1861, p. 241. — Atl. Ichth. I, 1862, p. 46.
Pseudoscarus Schlegeli Bleeker, ibid. p. 242. — Ibid. p. 48.
Pseudoscarus mutabilis Bleeker, ibid. p. 50.
Pseudoscarus schlegelii Günther, Cat. Brit. Mus. IV, 1862, p. 231.

Pseudoscarus pentazona Günther, l.c. — Fishes of Zanzibar 1866, p. 107.
Pseudoscarus cf. Sanctae-crucis Von Martens, Preuss. Exp. Ost-Asien. Zool. Th. Bd. I. 1876, p. 397.
Pseudoscarus mutabilis Günther, Fische der Südsee III, 1909, p. 316.
Callyodon mutabilis Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 414.
Callyodon mutabilis Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 378.
Scarus schlegeli Herre, Notes Fishes Zool. Mus. Stanford Univ. 1931, p. 79.

D. IX. 10. A. III. 9. P. 2. 12. V. I. 5. Ll. 17—18 + 7. Ltr. $\begin{array}{c}1\frac{1}{2}\\\hline 1\\\hline 6\end{array}$.

Height 2.7—2.9, 3.3—3.6 in length with caudal. Head 3.1—3.2, 3.7—3.9 in length with caudal. Height of head 1—1.1 in its length. Eye 5.9—6.5, 2.4—2.7 in snout and 2.1—2.4 in slightly convex interorbital space. Lips broad, covering the greater part of the dental plate. Inner upper lip well developed, its connection with the outer lip half way between rictus and symphysis of upper jaw or a little nearer to the latter. Nostrils small, the anterior one round with a low rim, the posterior one oval. Dental plate dirty whitish with a greenish hue. One or two strong canines posteriorly in the upper jaw and in the lower jaw. Cheek with two rows of scales, the lower row consisting of 5—6 scales and somewhat intruding on the inferior preopercular limb, which is otherwise broadly naked. Four scales before dorsal. Dorsal spines and rays subequal, as long as distance between eye and rictus; the posterior rays somewhat longer. Soft anal similar to soft dorsal. Pectorals a little more than half length of snout shorter than head. Ventrals pointed, as long as head without snout. Caudal truncate, the lobes scarcely produced. Colour of preserved specimens: Head violet above, dark violet on sides and below, snout and chin more or less pinkish. Lips green, the colour separated from the pink surroundings by a dark line. A green band on snout above upper lip, continued as a much broader band to inferior border of eye. This band bordered with a more or less distinct narrow dark line above and below. A green median longitudinal band along isthmus. Back lighter than sides, the scales green with a pink edge. A dark brown transverse band, more or less tinged with green and about two or three scales broad, from dorsal downwards to anal region, followed by a light transverse band on tail. This band is about two scales broad and the scales are light green with a pink edge in well preserved specimens. Rest of tail dark again, sometimes with an indication of a second dark transverse band immediately behind the light one. Sides of body and head darker or lighter violet. Dorsal with a bright green or white edge, with a terminal narrow longitudinal dark line and a similar line bordering it below. Rest of fin pink, with a median dark green band, changing posteriorly into blue and broken into a row of spots or ocelli, one between each ray. Base of dorsal again bright green or white, posteriorly as a row of large spots, one at base of each ray. Edge of anal bright green or white, separated from middle of fin, which is purple, by a dark line. Base of fin with a row of green spots, one at base of each ray. A median dark purple or dark green band, sometimes broken into a row of large spots. Caudal pink or violet with 3 transverse green bands, more or less broken into spots. Hind-margin of fin sometimes violet, the colour bordered at the inner side by a narrow wavy dark line. Upper and lower rays green or white, shading in pinkish towards their extremities and bordered along their inner side by a narrow dark line. Pectorals pinkish or bluish, the rays purple. A dark triangular spot at its base anteriorly. Anterior and posterior ventral rays greenish, more or less pinkish towards their extremities, middle rays pink, purple at the tip. In young specimens there are 5 more or less distinct dark transverse bands on body and tail and the caudal lobes may be more produced. Length 283 mm.

Habitat: Java (Batavia!); Celebes (Makassar); Ambon; Rotti!; New Guinea. — Zanzibar, Riu Kiu Islands, Philippines, Japan, Pelew Islands, Solomon Islands, Funafuti, Samoa. In sea.

Note. The specimen recorded by Von Martens from Ambon as "cf. *Sanctae-crucis*", which is an Atlantic species, most probably belongs to *mutabilis*. Prof. Pappenheim kindly informed me that Hilgendorf had already written on the label of the specimen: "cf. *pentazona*".

44. **Callyodon moensi** (Blkr.)

?*Scarus scabriusculus* Cuvier & Valenciennes, Hist. Nat. Poissons XIV, 1839, p. 271.
Scarus Moensi Bleeker, Acta Soc. Sc. Indo-Neerl. VIII, 1860. Dertiende bijdr. vischf. Celebes, p. 54.
Pseudoscarus Moensi Bleeker, Versl. Akad. Amsterdam XII, 1861, p. 241. — Atl. Ichth. I, 1862, p. 47.
?*Pseudoscarus scabriusculus* Bleeker, Atl. Ichth. I, 1862, p. 50.
?*Pseudoscarus scabriusculus* Guichenot, Mém. Soc. Imp. Sc. Nat. Cherbourg 1865, p. 56.
Pseudoscarus moensi Günther, Fische der Südsee III, 1909, p. 320.
Callyodon moensi Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 374.
?*Pseudoscarus* sp. aff. *moensi* Duncker & Mohr, Mitt. Zool. Mus. Hamburg XLIV, 1929, p. 69.

D. IX. 10. A. III. 9. P. 2. 12. (11). V. I. 5. Ll. 25.

Height 3, 3.5 in length with caudal. Head about 3, 3.4 in length with caudal. Height of head 1.3 in its length. Eye about 5, twice in snout and 1.5 in interorbital space. Nostrils minute. Lips covering part of dental plate. Inner upper lip well developed. Dental plate pinkish. Four posterior canines in the upper jaw. Two rows of scales on cheek, inferior preopercular limb naked. Dorsal spines and rays subequal, about equal to distance between corner of mouth and eye. Anal slightly less deep than dorsal. Pectorals more than half length of snout shorter than head. Ventrals equal to postorbital part of head. Caudal slightly rounded, the lobes scarcely produced. Olivaceous above, light pinkish below. Snout pink. Lips red, bordered with blue. No bands on head. Fins pink, dorsal and anal with a blue edge. Caudal edged with blue above and below. Pectorals and ventrals edged with blue along their front border. A small dark blotch at base of pectorals. Length 186 mm (After Bleeker, not seen by me).

Habitat: Java?; Celebes (Badjoa). — Red Sea?, Bismarck Archipelago?, New Hebrides, Carolines, Society Islands. In sea.

Note. *Scarus scabriusculus* has been briefly described as an elongate species with two rows of scales on the cheek and the inferior preopercular limb naked. No canines. Caudal rounded, the lobes produced. The colour is uniform yellowish, all the fins edged with green. The colouring reminds of *moensi,* but the absence of posterior canines and the produced caudal lobes make the synonymy uncertain. The specimens mentioned by Duncker & Mohr also lack posterior canines.

45. **Callyodon bataviensis** (Blkr.)

Scarus bataviensis Bleeker, Nat. Tijdschr. Ned. Indië XIII, 1857, p. 342.
Pseudoscarus bataviensis Bleeker, Versl. Akad. Amsterdam XII, 1861, p. 242. — Atl. Ichth. I, 1862, p. 48.
Pseudoscarus bataviensis Günther, Cat. Brit. Mus. IV, 1862, p. 231. — Fishes of Zanzibar 1866, p. 106.
Pseudoscarus bataviensis Day, Fishes of India, Suppl. 1888, p. 803.
Pseudoscarus bataviensis Steindachner, Denkschr. Akad. Wien LXX, 1900, p. 508.
Pseudoscarus bataviensis Seale, Occas. Papers B. P. Bishop Mus. I, No. 3, 1901, p. 96.
Scarus gilberti Jenkins, Bull. U. S. Fish Comm. XIX, 1901, p. 59.
Scarus jenkinsi Jordan & Evermann, ibid. XXII, (1902) 1904, p. 195.
Scarus gilberti Jenkins, ibid. p. 471.

Callyodon jenkinsi Jordan & Evermann, ibid. XXIII, (1903) 1905 p. 353.
Callyodon gilberti Jordan & Evermann, ibid. p. 354.
Callyodon bataviensis Jordan & Evermann, ibid. p. 356.
Callyodon bataviensis Jordan & Seale, Bull. Bur. Fish. XXV, (1905) 1906, p. 323.
Callyodon gilberti Jordan & Seale, ibid. p. 324.
Pseudoscarus bataviensis Günther, Fische der Südsee III, 1909, p. 317.
Callyodon bataviensis Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 377.

D. IX. 10. A. III. 9. P. 2. 12. V. I. 5. Ll. 17—18 + 7. Ltr. $\begin{array}{c}1\frac{1}{2}\\\hline 1\\\hline 7\end{array}$.

Upper profile of head convex or with a concavity before eyes. Height 2.7—3.1, 3.4—3.7 in length with caudal. Head 2.9—3.1, 3.5—3.7 in length with caudal. Height of head 1.1—1.2 in its length. Eye 5.4—7.2, 2—2.5 in snout and 2—2.2 in somewhat convex interorbital space. Lips rather broad, leaving about half of dental plate uncovered. Inner upper lip well developed, its connection with the outer lip slightly nearer to symphysis of upper jaw than to corner of mouth. Nostrils small, the anterior one with a low rim. Dental plate dirty yellowish. One or two strong posterior canines in the upper jaw and in the lower jaw generally present. Scales on cheek in two transverse rows, the inferior preopercular limb naked. Four or five scales before dorsal. Dorsal spines and rays subequal, about equal to distance between rictus and eye. Anal somewhat deeper than dorsal. Pectorals somewhat more or less than half snout shorter than head. Ventrals equal to head without snout. Caudal emarginate or truncate, the lobes well produced. Colour of preserved specimens pale, reddish or yellowish, most scales with a broad lighter border. Interorbital space and snout generally dark violet. A yellow band along upper lip, continued to lower border of eye. Some yellow streaks radiating from upper part of hindborder of eye. A yellow band along lower lip, followed by a transverse one on chin and generally with a round or irregular yellow patch on interopercle. Dorsal with a lighter or darker edge and sometimes with an indistinct dark median band, consisting of a series of cloudy blotches between the spines and rays. Caudal pinkish with a grey posterior edge, the lobes generally darker and bordered by grey along their outer and inner sides; the grey of the inner sides connected by a crescentic band which separates a lighter distal part of the caudal from a darker basal part. Anal pinkish basally, yellow terminally, the two colours separated by a narrow dark line. Pectorals yellowish or reddish at base, hyaline terminally. A dark spot in the axil. Ventrals pinkish, spine and first ray generally paler. Length 360 mm.

Habitat: Java (Batavia!); Sulu Islands! — Madagascar, Zanzibar, Coasts of British India, Philippines!, Pelew Islands, Guam, Marshall Islands, Carolines, New Hebrides, Ellice Islands, Marquesas Islands, Samoa, Tahiti, Hawaii, Laysan. In sea.

46. **Callyodon forsteri** (C. V.)

Scarus forsteri Cuvier & Valenciennes, Hist. Nat. Poissons XIV, 1839, p. 275.
?*Scarus capistratoides* Bleeker, Verh. Bat. Gen. XXII, (1847) 1849, Gladsch. Labr. p. 50.
?*Pseudoscarus capistratoides* Bleeker, Versl. Akad. Amsterdam XII, 1861, p. 234. — Atl. Ichth. I, 1862, p. 29.
?*Pseudoscarus capistratoides* Günther, Cat. Brit. Mus. IV, 1862, p. 239.
?*Pseudoscarus labiosus* Macleay, Proc. Linn. Soc. New S. Wales VII, 1882, p. 591.
?*Callyodon capistratoides* Jordan & Richardson, Bull. Bur. Fish. XXVII, (1907) 1908, p. 268.
Pseudoscarus forsteri Günther, Fische der Südsee III, 1909, p. 318.
Callyodon forsteri Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 410 (partim ?).
Callyodon forsteri Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 377. — Acad. Nat. Sc. Philadelphia, Monogr. 2, 1938, p. 176, 242.

D. IX. 10 (11). A. III. 9. P. 2. 12. V. I. 5. Ll. 17—18 + 8—10. Ltr. $\begin{array}{c} 1\frac{1}{2} \\ \hline 1 \\ \hline 6 \end{array}$.

Height 2.6—3.1, 3.3—3.6 in length with caudal. Head 2.9—3.1, 3.6—3.7 in length with caudal. Height of head 1.1 in its length. Eye 5.3—5.6, 2.1—2.4 in snout and 1.8—2.1 in slightly convex interorbital space. Lips rather broad, generally covering greater part of dental plate. Inner upper lip poorly developed, its connection with the outer lip nearer to rictus than to symphysis of upper jaw. Nostrils small, the anterior one with a low rim. Dental plate yellowish. A posterior canine in the upper jaw may be present. Two rows of scales on cheek, leaving a narrow preopercular limb naked. Four or five scales before dorsal. Dorsal spines and rays subequal, slightly more than distance between eye and corner of mouth. Anal slightly deeper than dorsal. Pectorals half length of snout shorter than head. Ventrals equal to head without snout. Caudal somewhat rounded, the lobes slightly produced. Colour of preserved specimens rather dark brown, most scales with a broad lighter edge and sometimes also with lighter frecklings. A more or less conspicuous darker or lighter band along upper and lower lip and from corner of mouth to eye. A similar transverse band on chin. Dorsal and anal dark brown with a lighter edge, sometimes with cloudy irregular brown spots or patches. Caudal generally light at base, darker brown in its distal half, which is sometimes crossed by a dark vertical band. Pectorals yellowish hyaline with a black spot in the axil. Ventrals yellowish or brown. Length 315 mm.

Habitat: Java (Batavia); Sulu Islands!; Tidore; Banda!; Rotti!; New Guinea (Moresby Bay). — Mauritius, Riu Kiu Islands, Formosa, Philippines! Pelew Islands, Guam, Fiji, Samoa, Tahiti, Hawaii, Laysan. In sea.

Note. I have followed Günther in uniting *capistratoides* Blkr. with *forsteri,* as Günther examined a typical specimen of Bleeker's species. I am however not convinced that they are the same. Bleeker records 13 branched rays in the pectoral, whereas Günther mentions 12. The caudal lobes are apparently also more produced in *forsteri.* My specimens agree in general shape and in the form of the caudal with *capistratoides,* but all of them have 12 branched pectoral rays.

4. Division Pomacentriformes

Body oblong or orbicular, compressed or much compressed, covered with ctenoid scales. Lateral line interrupted, the anterior part consisting of tubes, often ending with a few scales perforated by a pore only, the second part on caudal peduncle, if present, generally consisting of pores only. One dorsal fin, with the spinous portion well developed and as long as or longer than the soft portion. Two, sometimes three anal spines. The soft anal generally similar to the soft dorsal. Ventrals thoracic, with one spine and five soft rays. Five to seven branchiostegals. Three gills and a half. Pseudobranchiae present. Lower pharyngeals ankylosed to form a subtriangular plate; second upper pharyngeals distinct, third and fourth united. Teeth feeble, pointed or compressed, generally in few rows in the jaws. Palate edentulous. A single nostril on each side.

This division includes but a single family:

1. Family Pomacentridae

For characters of the family see those of the Division.

Distribution: Littoral fishes of warm seas, some species entering fresh water.

Key to the Indo-australian genera of Pomacentridae

- A. Two anal spines.
  - 1. Scales small, 50—80 in a median lateral series. Opercle, subopercle, and generally also interopercle with spines or radiating serrae.
    - *a*. Preorbital and suborbital each with a long spine, directed backward. Sq. l. 74—80 . . . . 1. *Premnas* p. 327.
    - *b*. Preorbital and suborbital without long spine, but with short denticulations only. Sq. l. 50—60. . . . . 2. *Amphiprion* p. 330.
  - 2. Scales large, 30—34 in a median lateral series. Opercle, subopercle and interopercle finely serrated . . . . 3. *Daya* p. 348.
  - 3. Opercle, subopercle, and interopercle smooth. Scales large, 27—36 in a median lateral series.
    - *a*. Teeth more or less compressed, incisiviform.
      - a'. Lips swollen, fimbriate and curled back over snout. . . . . 4. *Cheiloprion* p. 350.
      - b'. Lips normal.
        - a^2. Hindborder of preopercle serrated . . . . 5. *Pomacentrus* p. 352.
        - b^2. Hindborder of preopercle smooth. 6. *Abudefduf* p. 393.
    - *b*. Teeth conical or villiform.
      - a'. Seventeen dorsal spines. . . . . . . 7. *Acanthochromis* p. 446.
      - b'. Twelve to fourteen dorsal spines.
        - a^2. None of the opercular bones serrated . . . . 8. *Chromis* p. 448.
        - b^2. Preopercle serrated.
          - a^3. Body orbicular 27—30 scales in a median lateral series. . 9. *Dascyllus* p. 461.
          - b^3. Body elongate. 36 scales in a median lateral series. . . . 10. *Lepidozygus* p. 470.
- B. Three anal spines. Lateral line running along upper portion of sides. . . . . 11. *Zabulon* p. 471.

1. **Premnas** Cuvier

(Cuvier, Règne Animal I, 1817, p. 345)

Oval, head deep. Mouth oblique, with rather thick lips. Teeth incisiviform, in a single series in both jaws. Preorbital and suborbital each with a long spine. Opercle, subopercle, and interopercle with few and rather feeble more or less radiating serrae or spines. Opercular bones scaly, excepting the opercle, which is naked and rugose. Preopercle bluntly denticulated behind, its limb naked.

Scales beginning on upper side of head behind eyes. Scales of body small, 74—80 rows between gillopening and base of caudal. Lateral line developed as tubes in its anterior part, which runs parallel to the dorsal profile and ends below end of dorsal, continued as pores on the caudal peduncle, but generally only on a few scales and often altogether absent. Base of dorsal, anal and caudal with rows of small scales, forming a sheath. Between the basal half of most rays of dorsal, anal, and caudal, similar small scales, one row between each pair of rays. Dorsal consisting of X spines and 17—18 rays. Anal with II spines and 14—15 rays. Pectorals rounded. Ventrals pointed. Caudal rounded.

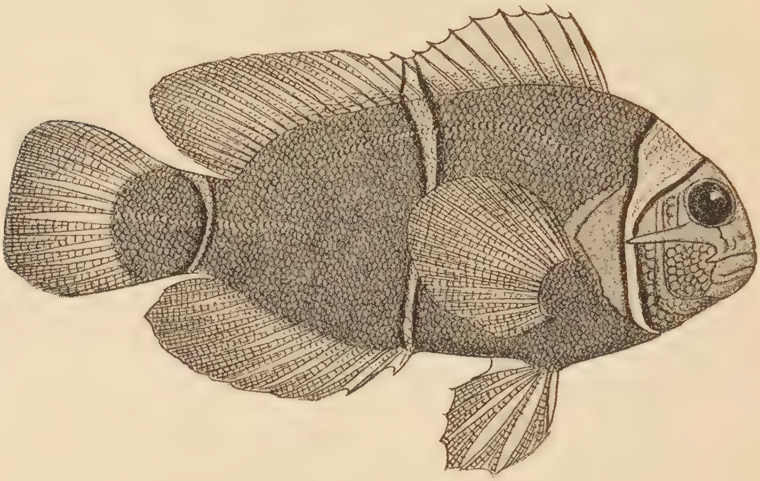

Fig. 41. *Premnas biaculeatus* (Bl.). n.s.

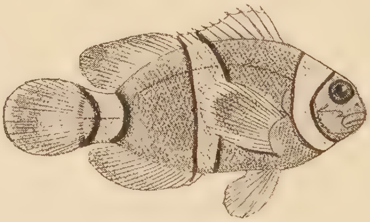

Fig 42. *Premnas biaculeatus* (Bl.) juv. n.s.

Distribution: that of the single species known.

1. **Premnas biaculeatus** (Bl.) (Fig. 41 and fig. 42, p. 328)

Chaetodon biaculeatus Bloch, Ausländ. Fische IV, 1790, p. 11.
Lutjanos trifasciatus Bloch Schneider, Syst. Ichth. 1801, p. 568.
Scorpaena aculeata Lacepède, Hist. Nat. Poissons III, 1802, p. 258, p. 268.
Holocentrus sonnerat Lacepède, ibid. IV, 1803, p. 344, p. 391.
Holacanthus biaculeatus Lacepède, ibid. p. 535.
Premnas trifasciatus Cuvier & Valenciennes, Hist. Nat. Poissons V, 1830, p. 405.
Premnas leucodesmus Cuvier & Valenciennes, ibid. p. 409.
Premnas semicinctus Cuvier & Valenciennes, l.c.
Premnas unicolor Cuvier & Valenciennes, ibid. p. 410.
Sargus ensifer Gray, Cat. Fish. Gronov. II, 1854, p. 66.
Premnas biaculeatus Bleeker, Nat. Tijdschr. Ned. Indië VI, 1854, p. 105.
Premnas biaculeatus Günther, Cat. Brit. Mus. IV, 1862, p. 10.
Premnas biaculeatus De Crespigny, Proc. Zool. Soc. London 1869, p. 248.
Premnas biaculeatus Day, Fishes of India, Prt. 3, 1877, p. 380.
Premnas biaculeatus Bleeker, Atl. Ichth. IX, 1877, Tab. 402. fig. 7, fig. 9. — Nat. Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 17.
Premnas biaculeatus Macleay, Proc. Linn. Soc. New S. Wales VII, 1882, p. 363.
Premnas epigrammata Fowler, Journ. Acad. Nat. Sc. Philadelphia (2) XII, Prt. 4, 1904, p. 532.
Premnas biaculeatus Vinciguerra, Ann. Mus. Civ. Genova (3) X (L), 1926, p. 564.
Premnas biaculeatus Ahl, Blätt. f. Aquar. u. Terrarienkunde XXXVII, 1926, N⁰ 15.
Premnas biaculeatus Montalban, Bur. Sc. Manila. Monogr. XXIV, 1927, p. 18.
Premnas biaculeatus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 5.
Premnas biaculeatus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 303.
Premnas biaculeatus McCulloch, Checklist Fish. Austr. Prt. II, 1929, p. 292.

D. X. 17—18. A. II. 14—15. P. 1. 15—16. V. I. 5. Ll. 49—46.

Ltr. $\dfrac{\overset{8-11}{1}}{33-36}$ Sq. l. 74—80.

Height 2—2.1, 2.4—2.7 in length with caudal. Head 3.2—3.4, 4—4.2 in length with caudal and 1.2—1.3 in its own height. Eye 4.8—5.2, 1.8—2 in snout and 1.5—1.8 in convex interorbital space. Mouth oblique, far below level of eye. Maxillary reaching to below frontborder of eye. Lips rather thick. Teeth incisiviform, in a single series in both jaws. Preopercle scaly, its posterior and inferior limb naked. Interopercle and subopercle scaly. Opercle scaleless, rugose. Preorbital spine about equal to eye, suborbital spine much longer, directed backwards and reaching on opercle. Preopercle strongly denticulated behind. About 20—23 rows of scales before dorsal, the first row on nape behind vertical through hindborder of eye. First dorsal spine slightly shorter than second, which is equal to snout and eye together. Following spines decreasing in size posteriorly, the 8th the shortest, the 9th and 10th equal and somewhat longer than the 8th, and half diameter of eye shorter than second spine. Soft dorsal much higher than spinous part, the 10th—12th rays longest and equal to head without snout. First anal spine small, second as long as second dorsal spine. Soft anal similar to soft dorsal. Pectorals rounded, equal to head. Ventrals somewhat shorter. Caudal rounded. Colour of preserved specimens lighter or darker brown, including the fins. Three chalky white transverse bands, lined with black: the first from nape over anterior part of opercle to isthmus, the second from 9th dorsal spine to origin of anal, the third on caudal peduncle. These bands broader or narrower and totally developed or only in their upper part, sometimes not more than a large blotch. They may be wanting with exception of the nuchal one. Pectorals and caudal sometimes dark with a light edge. Length 145 mm.

Habitat: Pulu Weh!; Sumatra (Siboga, Padang!); Simalur; Nias; Java (Batavia!); Duizend Islands!; Bawean; Borneo (Balikpapan!, Labuan, Sarawak); Celebes (Makassar, Togian Bay, Menado!; Talisse Island; Limbe Strait; Binang Unang in Gulf of Tomini); Saleyer! Solor; Damar!; Timor; Halmahera; Batjan; Ambon; Ceram; Goram; Banda; Kei Islands!; Waigeu; Nova Guinea (Port Moresby). — Mauritius, Coasts of British India, Philippines, Solomon Islands, New Hebrides, Queensland, Woodlark Island, Duke of York Island.

On coral reefs, living in symbiose with large Actinia.

2. **Amphiprion** Bloch Schneider

(Bloch Schneider, Syst. Ichth. 1801, p. 200)

Prochilus Bleeker, Nat. Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 20 (on Klein, 1775, non binominal).
Actinicola Fowler, Journ. Acad. Nat. Sc. Philadelphia (2) XII, 1904, p. 533.
Phalerebus Whitley, Mem. Queensl. Mus. IX, Prt III, 1929, p. 216.

Oval or oblong. Head deep. Mouth oblique with rather thick lips. Teeth rather strong, conical with rounded tips and more or less compressed, in a single series in both jaws. Preorbital and suborbital with one or more denticulations or spines. Opercle, subopercle, and generally also interopercle with radiating strong serrae or spines. Hindborder of preopercle with fine or coarse generally blunt denticulations, often almost smooth. All opercular bones scaly. Preopercular limb naked. Scales beginning on upper side of head before, between, or behind eyes. Scales of body small, about 50—60 transverse rows between gillopening and base of caudal. Lateral line developed as tubes in its anterior part, which runs parallel to the dorsal profile and ends below end of dorsal, and continued as pores on the caudal peduncle. Generally these pores are only developed on some of the scales, and often they are altogether absent. Base of dorsal, anal and caudal with rows of small scales, forming a sheath. Similar small scales between the basal halfs of the rays of the dorsal, anal, and caudal, one row between each pair of rays. Dorsal consisting of IX—XII spines and 13—21 rays. Anal with II spines and 11—15 rays. Pectorals rounded. Ventrals pointed or more or less rounded, truncate, emarginate or even forked.

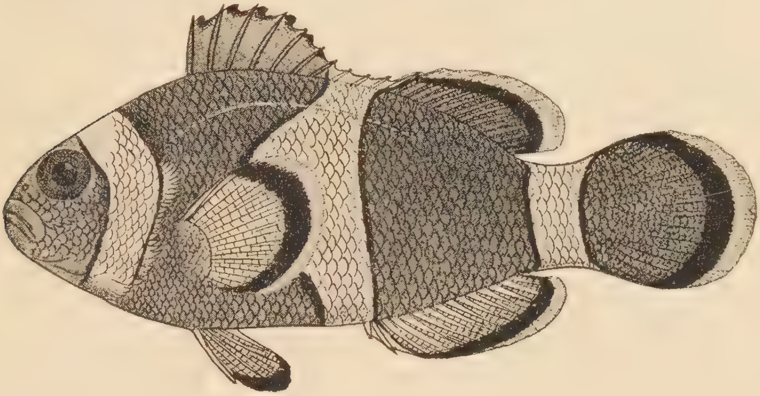

Fig. 43. *Amphiprion percula* (Lac.). × $2^1/_4$

Distribution: Living in symbiosis with large Actinia on coral reefs of the Indo-Pacific.

Key to the Indo-australian species of Amphiprion

I. A median narrow white band from interorbital space along base of dorsal and upperside of caudal peduncle to upper caudal rays. Scales on head reaching to line connecting frontborders of eyes. 13—15 branched pectoral rays.
  a. D. X. 15—16. A narrow transverse white band from temporal region to subopercle. . . . . 1. *A. perideraion* p. 332.
  b. D. IX. 18—20. No transverse bands. . . . . 2. *A. akallopisus* p. 333.
II. No median band along upper side of head, body, and tail. Generally one or more transverse white

bands on head and body. 14—18 branched pectoral rays.

a. Scales on head reaching to line connecting frontborders of eyes. 25—30 rows of scales before dorsal. Dorsal spines subequal. A large black blotch on sides of body. No transverse bands or a nuchal one only. . . . . 3. *A. ephippium* p. 334.

b. Scales on head reaching to line connecting middle of eyes. 25 rows of scales before dorsal. Dorsal spines subequal. Dark, with one nuchal band only. Interopercle smooth. . . 4. *A. melanopus* p. 337.

c. Scales on head reaching to line connecting middle or hindborders of eyes. 19—25 rows of scales before dorsal. Third and fourth dorsal spines longest, longer than last spines. Three broad transverse white bands; the second not bent backwards along superior part of dorsal in adults. The third band on caudal peduncle may be absent. . . . . . . 5. *A. bicinctus* p. 338.

d. Scales on head not reaching line connecting hindborders of eyes. 12—16 rows of scales before dorsal. Second or third to fifth or sixth dorsal spines longest, much longer than last spine. Three transverse white bands, the second bent backwards on superior part of soft dorsal or covering greater part of that fin. The third band may be absent.

*a*¹. Caudal dark, bordered with white. . . . 6. *A. polymnus* p. 342.

*b*¹. Caudal light . . . . 7. *A. sebae* p. 344.

e. Scales on head not reaching line connecting hindborders of eyes. 13—15 rows of scales before dorsal. Third to fifth dorsal spines longest, much longer than last spine. Three transverse white bands, the second with a triangular prolongation anteriorly . . . . . 8. *A. percula* p. 345.

1. **Amphiprion perideraion** Blkr.

Amphiprion perideraion Bleeker, Nat. Tijdschr. Ned. Indië IX, 1855, p. 437.

Amphiprion perideraion Günther, Cat. Brit. Mus. IV, 1862, p. 9.

Prochilus perideraion Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 37. — Atl. Ichth. IX, 1877, Tab. 400, fig. 1.

Amphiprion perideraeus Günther, Fische der Südsee II, 1881, p. 226.

Amphiprion perideraion Montalban, Monogr. Bureau Sc. Manila XXIV, 1927, p. 16.

Amphiprion perideraion Herre, Copeia 1936 (3), p. 167.

D. X. 15—16. A. II. 13. P. 2. 13—14. V. I. 5. Sq. l. 50. Ll. 36—39. Ltr. $\frac{4\frac{1}{2}-6}{\frac{1}{19-20}}$.

Height 2.1, 2.7 in length with caudal. Head 3.4—3.5, 4.6 in length with caudal. Length of head 1.2—1.3 in its height. Eye 2.9—3, equal to snout and 1.1—1.2 in somewhat convex interorbital space. Mouth oblique, maxillary reaching to below frontborder of eye. Strong conical teeth in a single row in both jaws. Preorbital, suborbital, interopercle, subopercle, and opercle strongly denticulated. Preopercle finely serrated behind. All opercular bones scaly. Preopercular limb naked. 24—26 rows of scales before dorsal. Scales reaching anteriorly almost to a line connecting frontborders of eyes. First dorsal spine about half length of second, which is somewhat shorter than third. Third to fifth spines longest, equal to eye or slightly longer. Last spine somewhat more than half diameter of eye, much shorter than first dorsal ray. Soft dorsal higher than spinous part of fin, the longest ray equal to snout and eye together. First anal spine half length of second, which is as long as 8th dorsal spine. Soft anal less deep than soft dorsal, the longest ray equal to snout and half diameter of eye together. Pectorals almost as long as head. Ventrals equal to head without snout. Caudal rounded. Colour of preserved specimens reddish brown. A narrow median pearly or chalky white band beginning on interorbital space, running along base of dorsal and along upper side of caudal peduncle to upper caudal rays, much brighter before dorsal than in its further course. Indications of a similar band along base of anal and along lower side of caudal peduncle to lower caudal rays. A narrow chalky white vertical band, the breadth of which is much less than diameter of eye, from temporal region over opercle to subopercle. Fins yellowish. Length 75 mm.

Habitat: Obi major; Ambon!; Haruko; Ceram; Banda, Goram; Misol. — Philippines, Pelew Islands. In sea.

2. **Amphiprion akallopisus** Blkr.

Amphiprion akallopisos Bleeker, Nat. Tijdschr. Ned. Indië IV, 1853, p. 281.
Amphiprion akallopisus Günther, Cat. Brit. Mus. IV, 1862, p. 10.
Amphiprion akallopisus Day, Fishes of India, Part III, 1877, p. 380.
Prochilus akallopisus Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 35. — Atl. Ichth. IX, 1877, Tab. 400, fig. 3.
Amphiprion akallopisos Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 17.
Phalerebus akallopisus Whitley, Mem. Queensl. Mus. IX, Part III, 1929, p. 216.
Phalerebus akallopisos Roxas & Martin, Techn. Bur. Sc. Manila VI, 1937, p. 185.

D. IX. 18—20. A. II. 12—13. P. 2. 14—15. V. I. 5. Sq. l. 53—57. Ll. 37—42. Ltr. $\begin{array}{c}4\text{—}6\\ \hline 1\\ \hline 18\text{—}19\end{array}$.

Height 2.3—2.4, 2.9—3 in length with caudal. Head 3.1—3.5, 3.8—4.3 in length with caudal. Length of head equal to its height. Eye 3—4.4, 1—1.5 in snout, and 1—1.2 in almost flat interorbital space. Mouth oblique, maxillary reaching to below frontborder of eye in young; in adults not quite so far. Preorbital, suborbital, interopercle, and subopercle strongly denticulated. Preopercle with a few blunt or more pointed serrations, sometimes almost smooth. Opercular bones scaly. Preopercular limb naked. 24—28 rows of scales before dorsal. Scales on upper part of head reaching to line connecting frontborders of eyes or beyond. First dorsal spine a little more than half length of second, which is shorter than third spine. Third to sixth spines subequal, equal to snout. Eight and ninth spines shortest, subequal, as long as diameter of eye. First dorsal ray as long as last spine. Post median dorsal rays longest, equal to snout and eye together. First anal spine less than half length of second, which is equal to eye. Soft anal less deep than soft dorsal, the longest rays somewhat longer than snout. Pectorals rounded, equal to head without snout. Ventrals as long as snout and eye together. Caudal slightly rounded. Colour of preserved specimens yellowish or brownish. A white narrow median band from interorbital space along base of dorsal and along upper border of caudal peduncle to upper rays of caudal. Length 95 mm.

Habitat: Pulu Weh!; Sumatra (Ulakan, Priaman, Padang!); Java (Poppoh Bay!); Buru; Ceram; Ambon. — Andamans, Philippines. In sea, on reefs.

3. **Amphiprion ephippium** (Bl.)

Lutjanus ephippium Bloch, Naturgesch. Ausländ. Fische IV, 1790, p. 121.

Amphiprion ephippium Bloch Schneider, Syst. Ichth. 1801, p. 200.

Lutjanus ephippium Lacepède, Hist. Nat. Poissons IV, 1802, p. 229.

Amphiprion ephippium Cuvier & Valenciennes, Hist. Nat. Poissons V, 1830, p. 386.

Amphiprion ephippium Schlegel & S. Müller, Verh. nat. gesch. Ned. overz. Bezitt. Zool. 1839—1841, Overzigt Amphiprion etc. p. 18.

Amphiprion ephippium Bleeker, Nat. Tijdschr. Ned. Indië VIII, 1855, p. 321.

?*Amphiprion frenatus* Brevoort, U. S. Japan Exp. Nat. Hist. Washington, 1856, p. 263.

?*Amphiprion frenatus* Gill, Proc. Acad. Nat. Sc. Philadelphia (1859) 1860, p. 148.

Amphiprion tricolor Günther, Cat. Brit. Mus. IV, 1862, p. 8.
Amphiprion ephippium Günther, ibid. p. 10.
Prochilus ephippium Bleeker, Ned. Tijdschr. Dierk. II, 1865, p. 278.
Prochilus polylepis Bleeker, Versl. Akad. Amsterdam XI, (1876) 1877, p. 135.
Amphiprion ephippium Day, Fishes of India, Part III, 1877, p. 378.
Amphiprion frenatus Day, l.c.
Prochilus polylepis Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 22. — Atl. Ichth. IX, 1877, Tab. 401, fig. 6.
Prochilus ephippium Bleeker, ibid. p. 23. — ibid. Tab. 401, fig. 1 and 9.
Amphiprion tricolor Macleay, Descr. Cat. Austr. Fish. II, 1881, p. 59.
Amphiprion ephippium var. *tricolor* Günther, Fische der Südsee II, 1881, p. 224, p. 225.
Amphiprion ephippium, var. *ephippium* Günther, l.c.
Amphiprion ephippium Day, Fauna of British India, Fishes II, 1889, p. 376.
?*Amphiprion frenatus* Jordan & Snyder, Proc. U. S. Nat. Mus. XXIII, 1901, p. 752. — ibid. XXIV (1901) 1902, p. 597.
?*Amphiprion frenatus* Snyder, ibid. XLII, 1912, p. 504.
Amphiprion ephippium Ahl, Wochenschr. f. Aquarien und Terrarienkunde XXII, 1925, N⁰ 17.
?*Amphiprion frenatus* Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 12.
Amphiprion polylepis Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 9.
Amphiprion ephippium Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 303.
Amphiprion polylepis Fowler, ibid. p. 304.
Amphiprion tricolor McCulloch, Checklist Fish Austr. Part II, 1929, p. 290.
Amphiprion ephippium Verwey, Treubia XII, Livr. 3—4, 1930, p. 361.
Amphiprion macrostoma Chevey, Travaux Inst. Océanogr. de l'Indochine. 4e Mém. 1932, p. 102 (nec Blkr).

D. X—XI. 16—17. A. II. 13—14. P. 2. 15—17. V. I. 5. Sq. l. 49—57. Ll. 32—41. Ltr. $\begin{array}{c}4\text{—}6\\ \hline 1\\ \hline 19\text{—}21\end{array}$.

Height 1.8—2.1, 2—2.6 in length with caudal. Head 2.7—3, 3.3—4 in length with caudal. Length of head 1.1—1.3 in its height. Eye 3.1—4.1, 1—1.6 in snout and 1—1.4 in slightly convex interorbital space. Mouth oblique, maxillary not or hardly reaching to below frontborder of eye. Strong conical teeth in a single row in both jaws. Suborbital, preopercle, interopercle, subopercle, and opercle strongly serrated, but lower border of preopercle and interopercle smooth. All opercular bones scaly. Preopercular limb naked. Scales reaching on head to a line connecting frontborders of eyes. 25—30 rows of scales before dorsal. Dorsal spines subequal, the first one only somewhat shorter. Last spine equal to snout and about of same height as first dorsal ray. Soft dorsal somewhat pointed behind. First anal spine less than half length of second, which is as long as tenth dorsal spine. Soft anal of same depth as soft dorsal, but somewhat more rounded behind. Pectorals rounded, as long as head. Ventrals about as long as pectorals. Caudal rounded or obliquely truncated. Colour of preserved specimens orange red or paler. A large deep black blotch on back and on sides below posterior part of spinous and whole of soft dorsal, downwards to near base of anal, lighter at its periphery and spreading sometimes anteriorly on back and upper part of head or on sides of body. A black line along the outer border of the ventrals and along the lower border of the anal, sometimes only partly developed. Rarely the caudal and dorsal are also narrowly edged with black. In young a chalky white narrow band is present, running from nape, behind eye, to posterior end of subopercle. According to Verwey this band develops first and afterwards a white spot appears on the back, just behind the middle. This spot soon vanishes again but the white band generally remains for two months after hatching, and then disappears gradually. It may however remain even in adults, but such specimens are rare in the Indo-australian Archipelago, whereas this is the common variety elsewhere, specimens without bands being apparently restricted to the Andamans, Nicobars, and the Indo-australian Archipelago.

Habitat: Pulu Weh!; Singapore; Sumatra (Padang!); Simalur!; Batu Islands; Nias; Banka; Java (Batavia); Solor; Ambon; Buru; Halmahera; New Guinea. — Andamans, Nicobars, Indochina, Riu Kiu Islands?, Japan?, Philippines?, Pelew Islands?, North Australia, Marianas, Fiji, Tonga Islands, Society Islands. In sea, on reefs.

Note. As has already been remarked by Verwey, adult specimens of this species from the Indo-australian Archipelago seldom retain the white nuchal band, whereas this seems to be the rule in specimens from the Philippines. These last ones apparently also differ in having less dorsal spines. Montalban counts nine or ten spines, Fowler & Bean nine, whereas I find amongst 28 specimens from the Indo-australian Archipelago 25 with 10 spines, 2 with 11 spines and none with 9 spines. I am however not quite sure that specimens from the Philippines, the Riu Kiu Islands, and Japan (*frenatus* Brevoort) belong to this species, as several authors describe the interorbital space as being scaleless. My doubt is strengthened by a specimen of Bleeker's collection in the Zoological Museum of Amsterdam, labelled by Bleeker as *ephippium,* and without locality, which has a nuchal band, nine dorsal spines and the scales on the head reaching to a line connecting middle of eyes.

4. **Amphiprion melanopus** Blkr.

Amphiprion melanopus Bleeker, Nat. Tijdschr. Ned. Indië III, 1852, p. 561.
Amphiprion melanopus Günther, Cat. Brit. Mus. IV, 1862, p. 8.
Prochilus melanopus Bleeker, Ned. Tijdschr. Dierk. I, 1863, p. 231.
Prochilus macrostoma Bleeker, Versl. Akad. Amsterdam XI (1876) 1877, p. 136. — Verh. Holl. Maatsch. Wetensch. (3) II, No. 6, 1877, p. 25. — Atl. Ichth. IX, 1877, Tab. 401, fig. 5.
Prochilus melanopus Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 26. — Atl. Ichth. IX, 1877, Tab. 401, fig. 7.
Amphiprion melanopus Macleay, Descr. Cat. Austr. Fish. II, 1881, p. 58.
Amphiprion ephippium, var. *melanopus* Günther, Fische der Südsee II, 1881, p. 224, p. 225.
Amphiprion ephippium Seale, Occas. Papers B. P. Bishop Mus. I, 1901, N⁰ 3, p. 81 (nec Bl.).
Amphiprion melanopus Jordan & Seale, Bull. Bur. Fish XXV, (1905) 1906, p. 278.
Amphiprion melanopus M. Weber, Siboga Exp. Fische, 1913, p. 335.
Amphiprion melanopus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 304.
Amphiprion melanopus McCulloch, Checklist Fish. Austr. Part II, 1929, p. 290.

D. X. 16. A. II. 14. P. 2. 16. V. I. 5. Sq. l. 48—51. Ll. 35—38. Ltr. $\begin{array}{c}4\text{—}6\\ \hline 1\\ \hline 19\text{—}21\end{array}$.

Height 1.9—2, 2.4 in length with caudal. Head 3.1—3.3, 4 in length with caudal. Length of head 1.3—1.4 in its height. Eye 3—3.6, 1.4 in snout or less in young, and 1—1.2 in slightly convex interorbital space. Mouth oblique, maxillary not quite reaching to below frontborder of eye. Strong conical teeth in a single row in the jaws. Preorbital and suborbital, and posterior border of preopercle moderately serrated. Opercle and subopercle strongly denticulated, interopercle smooth or with some feeble spines posteriorly in young specimens. All opercular bones scaly. Preopercular limb naked. Scales reaching on head to a line connecting middle of eyes. About 25 rows of scales before dorsal. Dorsal spines subequal, the first however somewhat shorter, the last spine equal to eye. In a young specimen the median spines are somewhat longer. First dorsal ray somewhat longer than last spine. Soft dorsal rounded behind. First anal spine less than half length of second, which is somewhat longer than dorsal spines. Soft anal slightly less deep than dorsal, acutely rounded behind. Pectorals rounded, a little less than head. Ventrals slightly shorter. Caudal obliquely truncate. Colour of preserved specimens very dark brown. Head, thorax and posterior part of caudal peduncle lighter. An oblique chalky white band, narrowly bordered with black, from before dorsal downwards behind eye to subopercle and posterior part of interopercle. Dorsal brownish, lighter in the distal part of the soft portion of the fin. Anal and ventrals deep brown. Pectorals and caudal yellowish. According to Bleeker in specimens of 42 mm there is a white band from base of posterior spines to anus. In a specimen of 44 mm examined by me there is no trace of this band. Length 106 mm.

Habitat: Singapore; Java (Prigi); Celebes (Menado); Ternate; Ceram; Ambon!; Flores!; Solor; New Guinea (Manokwari). — D'Entrecasteaux Island, Woodlark Island, Duke of York Island, North Australia, Solomon Islands, Ponapé, Guam, Rotuma, Samoa, Tonga Islands. In sea.

Note. This species is very near *bicinctus* Rüpp. and possibly is only a colour variety of lastnamed species. According to my material *melanopus* differs however in having the dorsal spines subequal, and in missing serrations on the interopercle, at least in adult specimens.

5. **Amphiprion bicinctus** Rüpp.

Anthia polymnus Bloch, Naturgesch. Ausländ. Fische VI, 1792, p. 103. (nec *Perca polymna* L).

Amphiprion bicinctus Rüppell, Atlas Reise N. Afrika. Fische des Rothen Meeres, 1828, p. 139.

Anthias clarkii Bennett, Fishes of Ceylon, 1828—1830, N⁰ 29.

Amphiprion polymnus Cuvier & Valenciennes, Hist. Nat. Poissons V, 1830, p. 396 (nec L).

Amphiprion chrysopterus Cuvier & Valenciennes, ibid. p. 401.

Amphiprion xanthurus Cuvier & Valenciennes, ibid. p. 402.

Sparus milii Bory St. Vincent, Dict. Class. Hist. Nat. XVI, 1831, p. 130.

Amphiprion clarckii Cuvier & Valenciennes, Hist. Nat. Poissons IX, 1833, p. 504.

Amphiprion japonicus Schlegel, Fauna Japonica, Parts 2—4, 1843, p. 66.

Amphiprion chrysargurus Richardson, Ichth. China. Japan. Rep. Brit. Ass. Adv. Sc. (1845) 1846, p. 254.

Amphiprion xanthurus Bleeker, Nat. Tijdschr. Ned. Indië III, 1852, p. 560.

Amphiprion chrysargurus Bleeker, ibid. p. 644.

?*Amphiprion Milii* Thiollière, Ann. Sc. phys. de la Soc. d'Agriculture, Lyon (2) VIII, 1856, p. 476.

Amphiprion polymnus Steindachner, Verh. zool. bot. Ges. Wien XI, 1861, p. 79 (nec L.).

Amphiprion clarki Günther, Cat. Brit. Mus. IV, 1862, p. 5.

Amphiprion xanthurus Günther, l.c.

Amphiprion Clarckii Bleeker, Ned. Tijdschr. Dierk. I, 1863, p. 231.

Amphiprion clarkii Kner, Novara Exp. Fische I, 1865—1867, p. 240.

Amphiprion bicinctus Günther, Fishes of Zanzibar, 1866, p. 80.

Amphiprion xanthurus Jouan, Mém. Soc. Sc. Nat. Cherbourg XIII (2. III), 1867, p. 257.

Amphiprion bicinctus Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 518.

Amphiprion boholensis Cartier, Verh. phys. med. Ges. Würzburg V, 1874, p. 96.

Amphiprion Clarkii var. *Japonicus* Von Martens, Exp. Ost Asien, Zool. I, 1876, p. 396.

Amphiprion Clarkii var. *chrysargurus* Von Martens, l.c.

Prochilus polymnus Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, Nº 6, 1877, p. 27. — Atl. Ichth. IX, 1877, Tab. 400, fig. 7, fig. 8 (nec L.).

Amphiprion Clarkii Day, Fishes of India, Part III, 1877, p. 378.

Prochilus xanthurus Bleeker, Recherches fauna Madagascar. Pollen & van Dam. 4e Partie, Poissons de Madagascar, 1878, p. 85.

Amphiprion ephippium var. *clarkii* Günther, Fische der Südsee II, 1881, p. 224.

Amphiprion ephippium var. *xanthurus* Günther, l.c.

Amphiprion ephippium var. *chrysargurus* Günther, l.c.

Amphiprion ephippium var. *bicinctus* Günther, l.c.

Amphiprion ephippium var. *chrysopterus* Günther, ibid. p. 225.

Amphiprion Clarkii Macleay, Descr. Cat. Austr. Fish. II, 1881, p. 57.

Amphiprion bicinctus Macleay, ibid. p. 58.

Amphiprion Papuensis Macleay, Proc. Linn. Soc. New S. Wales VIII, 1883, p. 271.

Amphiprion clarkii Günther, Proc. Zool. Soc. London 1887, p. 664.

Amphiprion ephippium Day, Fauna Br. India, Fishes II, 1889, p. 376.

Amphiprion xanthurus Sauvage, Poissons de Madagascar 1891, p. 420.

Amphiprion polymnus Sauvage, ibid. p. 421 (nec L.).

Amphiprion ephippium var. *clarki* Steindachner, Abh. Senckenb. naturf. Ges. XXV, 1901, p. 438.

Amphiprion bicinctus Seale, Occas. Papers B. P. Bishop Mus. I, 1901, p. 82.

Amphiprion polymnus Jordan & Snyder, Proc. U. S. Nat. Mus. XXIV, (1901) 1902, p. 598 (nec L.).

Amphiprion polymnus Jordan & Seale, ibid. XXIX, 1905, p. 523 (nec L.).

Amphiprion polymnus Steindachner, Sitzber. Akad. Wien CXV, 1906, p. 1395 (nec L.).

Amphiprion polymnus Jordan & Seale, Bull. Bur. Fish. XXV (1905) 1906, p. 278. — Proc. Davenport Acad. Sc. X (1905) 1907, p. 13 (nec L.).

Amphiprion chrysopterus Jordan & Dickerson, Proc. U. S. Nat. Mus. XXXIV, 1908, p. 611.

Amphiprion japonicus Jordan, Tanaka & Snyder, Journ. Coll. Sc. Univ. Tokyo XXXIII, Art. 1, 1913, p. 192, p. 430.

Amphiprion polymnus Whitley, Austr. Zoologist IV, Part IV, 1926, p. 230 (nec L.).

Amphiprion polymnus Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 10 (nec L.).

Amphiprion papuensis Whitley, Rec. Austr. Mus. XVI, 1928, p. 218.

Amphiprion polymnus Fowler & Bean, Bull. U. S. Nat. Mus. 100, Vol. VII, 1928, p. 6 (nec L.).

Amphiprion polymnus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 303 (nec L.).

Amphiprion bicinctus Fowler, ibid. p. 304.

Amphiprion papuensis Whitley, Mem. Queensl. Mus. IX, Part. III, 1929, p. 210, p. 234.

Amphiprion polymnus Whitley, ibid. p. 233 (nec L.).
Amphiprion milii Whitley, p. 234.
Amphiprion milii McCulloch, Checklist Fish. Austr. Part I, 1929, p. 291.
Amphiprion polymnus Verwey, Treubia XII, Livr. 3—4, 1930, p. 358 (nec L.).

D. X. 15—17. A. II. 13—14. P. 2.16—17. V. I. 5. Sq. l. 51—55. Ll. 38—40. Ltr. $\begin{array}{c} 4-6 \\ \hline 1 \\ \hline 19-22 \end{array}$.

Height 1.8—2.1, 2.3—2.7 in length with caudal. Head 2.9—3.4, 3.7—4.5 in length with caudal. Length of head 1.3—1.4 in its height. Eye 2.9—3.6, 1—1.1 in snout and 1—1.2 in slightly convex interorbital space. Mouth oblique, maxillary scarcely reaching to below frontborder of eye. Strong conical teeth in a single row in both jaws. Preorbital, suborbital, opercle, subopercle, and interopercle strongly denticulated. Preopercle rather finely serrated behind, its inferior border generally smooth. All opercular bones scaly. Preopercular limb naked. Scales reaching on head to a line connecting middle of eyes, sometimes only to a line connecting hindborders of eyes. 19—25 rows of scales before dorsal. Third and fourth dorsal spines generally longest, equal to eye and snout or somewhat less. Last spine equal to eye, shorter than first dorsal ray. Soft dorsal rounded behind. First anal spine half length of second, which is equal to diameter of eye. Soft anal less deep than soft dorsal, acutely rounded behind. Ventrals equal to or even somewhat longer than rounded pectorals and equal to head. Caudal emarginate, generally forked in large specimens. Colour of preserved specimens dark brown, snout and sometimes also thorax much lighter and pinkish. In lastnamed specimens the ventrals and anal are also light pinkish, the anal with a narrow inferior, the ventrals with a narrow outer border black. In the dark specimens ventrals and anal are deep dark brown. Three broad transverse chalky white bands, more or less distinctly bordered with a narrow black line. The first from nape, obliquely downwards along hindborder of eye, over posterior part of preopercle and anterior part of opercle to posterior part of interopercle and subopercle. The second one beginning on basal half of the three posterior dorsal spines and their membranes to anus and base of anal, and fusing here with that of the other side. The third covering the greater part of the caudal peduncle to the base of the caudal, which is also white or yellowish. Occasionally this last band is wanting. The caudal may also be black in stead of yellow. Pectorals yellowish, sometimes with a dark brown blotch at their bases or even dark brown in their basal halfs and light distally. Dorsal black or brown, sometimes with a narrow white edge along the soft dorsal. These are the remains of a juvenile coat, the development of which is according to Verwey as follows: Young specimens of 12 mm length have already developed the dark colour and the three white bands, but differ from the adults in that they show much more yellow and white. Snout, spinous dorsal, pectorals, anal, and caudal are pure yellow for their greater part. The second white band extends over the anterior and upper margin of the soft dorsal and the third band around the caudal peduncle extends along the upper edge of the caudal and fringes that fin. When growing older, the pectorals and caudal remain yellow, but the dorsal, anal, and ventrals become gradually darker. In a specimen of 45 mm length the tips of the fins were still yellow. In specimens of about 90 mm length the white colour of the second band disappears from the edge of the soft dorsal. At the same time the caudal changes from rounded to truncated and finally to furcated. Length 136 mm.

Habitat: Pulu Weh!; Sumatra (Priaman, Siboga); Nias; Banka; Duizend Islands; Java (Batavia); Celebes (Menado, Gulf of Tomini, Limbe Strait); Flores!; Solor; Ternate; Tidore; Makian; Batjan; Buru; Ceram; Ambon!; Haruko; Banda!; Goram; New Guinea (Manokwari). — Madagascar, Mozambique, Zanzibar, Red Sea, Arabian Sea, Mauritius, Ceylon, coast of British India, Annam, China, Japan, Riu Kiu Islands, Philippines, Marianas, Pelew Islands, Carolines, Solomon Islands, D'Entrecasteaux Group, Woodlark Island, North and West Australia, Lord Howe Island, Fiji, Samoa, Kingsmill Islands, Society Islands. In sea, on reefs.

Note. This species has generally been called *polymnus,* but according to Lönnberg who examined the type of *polymnus,* lastnamed species is identical with *bifasciatus. A. bicinctus* is the oldest name for this species. Bleeker (1877) thought that it was different, because Rüppell described it as having eleven dorsal spines, but Günther and Klunzinger, describing certainly the same species, count ten spines. The missing of the third band on the caudal peduncle is not a specific character. Verwey l.c. saw on the reefs in the Bay of Batavia a specimen without band forming a couple with a normal one. Whitley (1926, l.c.) says that in speicmens from North West Islet, Capricorn Group "the young have a white band through the caudal peduncle which disappears with age". So here again we see variation, not restricted geographically, although the preponderance of one variety over the other may be different in different localities.

6. **Amphiprion polymnus** (L.)

Perca polymna Linné, Syst. Nat. ed. X, 1758, p. 291.
Anthias bifasciatus Bloch, Naturgesch. Ausländ. Fische VI, 1792, p. 108.
Amphiprion bifasciatus Bloch Schneider, Syst. Ichth. 1801, p. 204.
Lutjanus jourdin Lacepède, Hist. Nat. Poissons IV, 1802, p. 191, p. 235.
Amphiprion bifasciatus Cuvier & Valenciennes, Hist. Nat. Poissons V, 1830, p. 392.
Amphiprion laticlavius Cuvier & Valenciennes, ibid. p. 394.
?*Amphiprion trifasciatus* Cuvier & Valenciennes, ibid. p. 395.
Amphiprion intermedius Schlegel & Müller, Verh. nat. gesch. Ned. overz. Bezitt. Zool. 1839—1841, Overzigt Amphiprion etc. p. 18.
Amphiprion bifasciatus Bleeker, Nat. Tijdschr. Ned. Indië III, 1852, p. 282.
Amphiprion trifasciatus Bleeker, ibid. p. 767.
Amphiprion bifasciatus Günther, Cat. Brit. Mus. IV, 1862, p. 3.
Amphiprion intermedius Günther, ibid. p. 4.
Prochilus bifasciatus Bleeker, Verh. Akad. Amsterdam XVI, 1864, p. 360. — Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 31. — Atl. Ichth. IX, 1877, Tab. 400, fig. 4, fig. 5, fig. 6.
Amphiprion bifasciatus Day, Fishes of India, Part III, 1877, p. 379.
?*Prochilus trifasciatus* Bleeker, Recherches faune Madagascar, Pollen & van Dam, 4e Partie, Poissons de Madagascar, 1878, p. 85.
Amphiprion bifasciatus Sauvage, Poissons de Madagascar 1891, p. 419 (sine syn.?).
Amphiprion polymnus Löhnberg, Bih. Svenska Akad. XXII, 1896, N⁰ 1, p. 43.
?*Amphiprion intermedius* Jatzow & Lenz, Abh. Senckenb. naturf. Ges. XXI, 1899, p. 517.
Amphiprion intermedius Horst, Notes Leyden Mus. XXIII, 1902, p. 180.
Amphiprion bifasciatus Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 15.
Amphiprion unimaculatus Whitley, Mem. Queensl. Mus. IX, Part III, 1929, p. 233.
Amphiprion unimaculatus McCulloch, Checklist Fish. Austr. Part II, 1929, p. 290.
Amphiprion bifasciatus annamensis Chevey, Travaux Inst. Océan. Indochine 4e Mémoire, 1932, p. 99.

D. X—XI. 13 (14). A. II. 12 (13). P. 2. 16—18. V. I. 5. Sq. l. 50—55. Ll. 35—41. Ltr. $\begin{array}{c}4\text{—}6\\\hline 1\\\hline 19\text{—}21\end{array}$.

Height 2.2, 2.7—2.9 in length with caudal. Head 3, 3.8 in length with caudal. Length of head 1.1 in its height. Eye 3.4—4.5, equal to snout and to convex interorbital space. Mouth oblique, maxillary reaching to below frontborder of eye. Rather strong conical teeth in a single row in both jaws. Preorbital with one or two spines.

Suborbital scalloped or with feeble blunt spines. Preopercle feebly denticulated along its hindborder, and sometimes also along its lower border, in older specimens sometimes almost smooth. Interopercle, and specially subopercle and opercle coarsely denticulated. Opercular bones scaly. Preopercular limb naked. Scales reaching on head half diameter of eye or a little less behind a line connecting hindborders of eyes. 13—16 rows of scales before dorsal. Second or third to fifth or sixth dorsal spines subequal and longer than the others, about equal to snout; sometimes the third spine slightly longer. Last spine equal to half diameter of eye or a little longer, much shorter than first dorsal ray. Soft dorsal rounded, much higher than spinous part, the longest ray equal to snout and eye together or a little shorter. First anal spine half length of second, which is a little more than half diameter of eye. Soft anal rounded, as deep as soft dorsal. Pectorals and ventrals subequal, equal to head without snout or a little longer. Caudal slightly rounded. Colour of preserved specimens dark brown or almost black. Three broad chalky white transverse bands may be present. The first from nape immediately behind eye over preopercle and opercle to subopercle and interopercle, always present. The second beginning on posterior part of spinous dorsal and extending on anterior part of soft dorsal or almost to its end. In the first case it is continued backwards as a narrower or broader edge of the fin and it reaches downwards to anus, tapering here and joining that of the other side or not. In the second case the whole of the soft dorsal, excepting a narrow dark hindmargin is white and the band goes not further downwards than the middle of the sides, forming a large white rounded patch on the body. The third band covers the posterior half of the caudal peduncle, but may be absent, apparently always so in case the second band is not developed in its ventral part. Dorsal dark brown, excepting the part covered by the second transverse band. Ventrals, anal, and pectorals dark brown, the latter sometimes light in their distal part. Caudal dark brown, edged with white. This edge wider towards the lobes, the dark brown colour therefore forming a more or less triangular patch, with the base coinciding with the base of the caudal fin. Length 125 mm.

Habitat: Pulu Weh!; Singapore!; Sumatra!; Nias; Banka; Bali; Celebes (Makassar, Badjoa, Menado, Amurang); Sula Islands!; Buru; Ceram; Ambon; Saparua; Goram; New Guinea. — Réunion?, Zanzibar?, Andamans, Annam, China, Philippines, Darnley Island, Queensland.

Note. Lönnberg l.c. has examined the specimens of the collection in the Zoological Museum of the University of Upsala, which have been described by Linné. On the page cited he says: "*Perca polymna.* There is no reason to doubt that this is the type specimen, the less so as Linnaeus himself says that the type is kept in "Mus. Acad.". It represents the present *Amphiprion bifasciatus* Bl. Schn., the name of which will thus be *Amphiprion polymnus* (L.)." This statement has been overlooked by later authors and although the alteration may create confusion, as *polymnus* has been used for the species which now must be called *bicinctus,* we have to accept it.

Although Sauvage l.c. redescribed the type of *A. trifasciatus* he does not say if the second white band is bent along the edge of the dorsal. His description is also applicable to a specimen of *bicinctus* with a dark caudal. The specimen figured by Jatzow & Lenz is a juvenile stage and much resembles that of *bicinctus* as described by Verwey. Lastnamed author did not find this species in the Bay of Batavia, but the symbiose of this species with a *Discosoma* has been mentioned by Horst l.c.

7. **Amphiprion sebae** Blkr.

Amphiprion Sebae Bleeker, Nat. Tijdschr. Ned. Indië IV, 1853, p. 478.
Amphiprion sebae Günther, Cat. Brit. Mus. IV, 1862, p. 4. — Proc. Zool. Soc. London 1887, p. 664.
Prochilus Sebae Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 30. — Atl. Ichth. IX, 1877, Tab. 400, fig. 9.
Amphiprion sebae Day, Fishes of India, Part III, 1877, p. 378.
Amphiprion sebae Perugia, Ann. Mus. Civ. Genova (2) VII, 1889, p. 275.
Amphiprion sebae Thurston, Madras Govern. Mus. Bull. III, 1895, p. 137.
Amphiprion sebae Johnstone, Pearl Oyster Rep. II, Fishes, 1904, p. 212.
Amphiprion sebae Tate Regan, Trans. Linn. Soc. London XII (3), 1908, p. 230.
Amphiprion sebae Ahl, Blätter f. Aquarien und Terrarienkunde XXXVII, 1926, Heft 14.
Amphiprion sebae Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 305.

D. X—XI. 14—15. A. II. 13—14. P. 2. 17—18. V. I. 5. Sq. l. 49—52. Ll. 34—40. Ltr. $\begin{array}{c}5-7\\ \hline 1\\ \hline 18-19\end{array}$.

Height 2—2.2, 2.7—2.9 in length with caudal. Head 3—3.2, 3.8—4.1 in length with caudal. Length of head 1.1—1.2 in its height. Eye 3—3.5, 1—1.2 in snout and 1—1.3 in convex interorbital space. Mouth oblique. Maxillary reaching to below frontborder of eye. Rather strong conical teeth in a single row in both jaws. Preorbital with a single spine posteriorly, directed downwards. Suborbital with a few feeble spines posteriorly, sometimes inconspicuous. Hindborder of preopercle and sometimes also inferior border with rather fine denticulations. Interopercle, and especially subopercle and opercle with strong serrations. Opercular bones scaly. Preopercular limb naked. Scales reaching on head about half diameter of eye behind a line connecting hindborders of eyes, sometimes almost reaching that line. 12—16 rows of scales before dorsal. Second or third to sixth dorsal spines longest, equal to snout; tenth a little more than half diameter of eye, much shorter than first dorsal ray. Soft dorsal rounded, much higher than spinous part, the longest ray equal to snout and half diameter of eye together. First anal spine half length of second, or a little less or more. Second spine equal to eye or nearly so. Soft anal rounded, as deep as soft dorsal. Pectorals rounded, equal to ventrals and to head without snout. Caudal truncate or slightly rounded. Colour of preserved specimens dark brown. Three broad transverse chalky white or yellowish bands; the first from nape, immediately behind eye, over opercle and preopercle to interopercle and subopercle. The second from posterior dorsal spines and anterior dorsal rays to anal region, generally tapering here and not connected with that of the other side, the anus therefore in a dark area. This band is continued superiorly on the dorsal fin and prolonged backwards as a rather broad white edge to the soft dorsal, which is otherwise of the colour of the body, as well as the spinous part. Third band on posterior part of caudal peduncle and fusing with the light yellow colour of the caudal fin. Pectorals, ventrals, and anal deep brown or almost black, the latter sometimes with a narrow white edge. Length 115 mm.

Habitat: Pulu Weh!; Sumatra (Lampong, Siboga); Nias!; Java (Batavia). — Arabian Sea, Coast of British India, Andamans, Guam. In sea, on reefs.

Note. I think it very probable that this species is only a colour variety of *polymnus,* in which the black triangular patch on the caudal has disappeared.

8. **Amphiprion percula** (Lac.) (Fig. 43, p. 331)

Anthias polymnus var. Bloch, Naturgesch. Ausländ. Fische VI, 1792, p. 106.
Lutjanus percula Lacepède, Hist. Poissons IV, 1802, p. 194, p. 239.
Amphiprion percula Cuvier & Valenciennes, Hist. Nat. Poissons V, 1830, p. 397.

Amphiprion tunicatus Cuvier & Valenciennes, ibid. p. 399.
Amphiprion ocellaris Cuvier & Valenciennes, l.c.
Amphiprion melanurus Cuvier & Valenciennes, ibid. p. 400.
Amphiprion percula Schlegel & Müller, Verh. nat. gesch. Ned. overz. Bezitt. Zool. 1839—1841. Overzigt Amphiprion etc. p. 19.
Amphiprion percula Bleeker, Nat. Tijdschr. Ned. Indië III, 1852, p. 287.
Amphiprion ocellaris Bleeker, Acta Soc. Sc. Indo-Neerl. VIII, 1860. Achtste bijdr. vischfauna Sumatra, p. 35.
Amphiprion melanurus Bleeker, l.c.
Amphiprion percula Steindachner, Verh. zool. bot. Ges. Wien XI, 1861, p. 78.
Amphiprion percula Günther, Cat. Brit. Mus. IV, 1862, p. 6.
Prochilus percula Bleeker, Ned. Tijdschr. Dierk. I, 1863, p. 240. — Verh. Holl. Maatsch. Wetensch (3) II, N⁰ 6, 1877, p. 33. — Atl. Ichth. IX, 1877, Tab. 400, fig. 2.
Amphiprion bicolor Castelnau, Proc. Zool. Acclim. Soc. Victoria II, 1873, p. 92.
Amphiprion percula Day, Fishes of India, Part III, 1877, p. 379.
Amphiprion percula Günther, Fische der Südsee II, 1881, p. 225.
Amphiprion percula Macleay, Descr. Cat. Austr. Fish. II, 1881, p. 57.
Amphiprion (Actinicola) percula Fowler, Journ. Acad. Nat. Sc. Philadelphia (2) XII, Part 4, 1904, p. 533.
Amphiprion percula Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 14.
Amphiprion percula Fowler & Bean, Bull. U.S. Nat. Mus. 100. Vol. VII, 1928, p. 11.
Amphiprion percula Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 305.
Amphiprion percula Duncker & Mohr, Mitt. Zool. Staatinst. und Zool. Mus. Hamburg XLIV, 1929, p. 68.
Actinicola percula Whitley, Mem. Queensl. Mus. IX, Part III, 1929, p. 213. — Great Barrier Reef Exp. Brit. Mus. Sc. Reports IV, N⁰ 9, 1933, p. 289.
Actinicola bicolor Whitley, ibid. 1929, p. 215.
Amphiprion percula Verwey, Treubia XII, Livr. 3—4, 1930, p. 357.
Amphiprion percula Herre, Copeia 1936, N° 3, p. 167.

D. X—XII. 14—15. A. II. 11—12 (13). P. 2. 14—16. V. I. 5.

Sq. l. 51—56. Ll. 32—36. Ltr. $\begin{array}{c}5\text{—}6\\ \hline 1\\ \hline 22\text{—}26\end{array}$.

Height 2—2.3, 2.7—2.9 in length with caudal. Head 3, 3.8—3.9 in length with caudal. Height of head equal to its length. Eye 4.2—4.8, 1.2—1.4 in snout and 1—1.2 in the flat interorbital space. Mouth oblique, maxillary reaching below frontborder of eye or nearly so. Preorbital, suborbital, interopercle, subopercle, and opercle strongly serrated, preopercle almost smooth behind, slightly denticulated near its angle. Opercular bones scaly. Preopercular limb naked. Scales on head beginning about one eye diameter behind eye. 13—15 rows of scales before dorsal. First dorsal spine generally somewhat shorter than third, forth and fifth, which are subequal and equal to snout and half diameter of eye together. Following spines rapidly decreasing in size till the seventh, which is slightly longer than eighth spine. Eighth to last spines subequal, as long as eye or somewhat shorter. Soft dorsal rounded, the first ray much longer than last spine, the median rays longest and equal to postorbital part of head or one eye diameter longer. First anal spine about half length of second, which is equal to snout. Soft anal rounded, the post median rays longest, equal to snout and eye. Caudal rounded. Pectorals rounded, slightly shorter than head. Ventrals somewhat shorter. Colour generally bright orange, fading to yellowish in preserved specimens. Three broad white transverse bands, bluish in life, bordered by black. The first from nape, behind eye, over opercle to interopercle; the second from posterior part of spinous dorsal to anus. The posterior border of this band almost straight and vertical, the anterior obliquely bent forward and sharply backward again at middle of sides, forming a triangular prolongation of the band directed forward. Third band covering almost the whole caudal peduncle. All fins of the colour of the body or lighter, with a narrow terminal white and a broader or narrower black subterminal band. The white terminal band generally wanting on the ventrals. The black band sometimes wanting on the caudal, dorsal, and anal, in which case these fins have a white edge only. Often the black borders of soft dorsal and anal are confluent with the black margins of the second band on body and equally that of the caudal may be confluent with the posterior black border of the third band. The third band may be developed as a saddle only and in one specimen examined the second band was normally developed on the left side, but ending on middle of sides on the right side. Lastnamed band may be continued as a sharp triangular prolongation on anterior part of soft dorsal. The space between the first and second band is rarely blackish. According to Verwey newly hatched specimens are grey. After some days they get a reddish pink hue. After about 12 days the first band appears, a week later the second, and after another week the third band is developed. They measure then 12.5 mm. Length 85 mm. The females grow to a larger size than the males.

Habitat: Pulu Weh!; Singapore; Sumatra (Benkulen, Trussan, Padang!, Batu Sangkar, Ulakan, Priaman, Siboga); Batu Islands; Nias; Banka; Biliton; Lepar; Krakatau!; Java (Batavia, Anjer); Duizend Islands!; Island Samalona! and Reef de Bril! near Makassar; Kabala Dua, Borneo Bank!; Celebes (Makassar!, Menado, Sadaa, Basa Reef, Gulf of Tomini); Sulu Islands!;

Ternate; Batjan; Obi Major; Buru; Ceram; Ambon!; Gisser!; Haruko; Nusa Laut; Goram; Banda; Sumbawa!; Rotti!; Timor; Kei Islands!; Waigeu; Schouten Islands; New Guinea (Manokwari, Atjatuning!, Papua). — Coast of British India, coast of Burma, Andamans, Nicobar Islands, China, Philippines, Pelew Islands, New Britain, New Ireland, St. Matthias, Ekaliu, Duke of York Island, Solomon Islands, Santa Cruz Islands, Queensland, Fiji, Society Islands. On reefs.

Note. This is the most common species of *Amphiprion* in the Indo-australian Archipelago. The number of dorsal spines varies, but specimens from this region have generally eleven spines. Among 58 specimens examined, 50 had eleven spines, 4 ten spines and 4 twelve spines.

Doubtful species

1. **Amphiprion rosenbergi** Blkr.

Amphiprion rosenbergi Bleeker, Acta Soc. Sc. Indo-Neerl. VI, 1859, Bijdr. vischf. Nieuw Guinea, p. 16.
Prochilus Rosenbergi Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 38. — Atl. Ichth. IX, 1877, Tab. 402, fig. 2.
Amphiprion Rosenbergi Duncker & Mohr, Mitt. Zool. Mus. Hamburg XLIV, 1929, p. 68.
Amphiprion rosenbergi Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 305. — ibid. XI, N⁰ 6, 1934, p. 431.

Bleeker is the only one who gave a description of this species, after a specimen of 26 mm length. It is not known how far the scales reach anteriorly on the upper part of the head. There is a notch between the spinous and the soft part of the dorsal, the colour is pinkish orange and there is only one margaritaceous band from nape to interopercle. D. X. 15 (16). A. II. 12 (13). P. 2. 13. V. I. 5. Sq. l. about 55. It is certainly the young stage of some species of *Amphiprion*, as has already been suggested by Bleeker, who thought it possible that it represented the young of *A. perideraion*. It seems to me that it might be a young *A. percula*.

Habitat: New Guinea (Manokwari). — St. Matthias.

3. **Daya** Bleeker

(Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 71)

Oblong, much compressed. Mouth oblique, with rather thick lips. Teeth in a single series, compressed, the cutting edge conical, those of the sides smaller than the front ones. Preorbital and suborbital scaleless, with a smooth edge, the suborbital very low. Opercle with two flat spines and with the lower part of its hindborder very finely denticulated. Lower border of subopercle and interopercle with similar denticulations. Hindborder of preopercle with stronger denticulations. All opercular bones scaly, posterior preopercular limb naked. Scales on head reaching to posterior part of interorbital space. About 30—34 scales between gillopening and base of caudal. Lateral line developed as tubes in its anterior part and as pores on the posterior part on caudal peduncle. A low scaly sheath at base of soft dorsal and anal. Rows of small elongate scales on basal half of dorsal and anal rays. Dorsal consisting of XIII spines and 12—13 rays. Anal with II spines and 12—14 rays. Pectorals and ventrals more or less pointed. Caudal deeply forked, the lobes pointed.

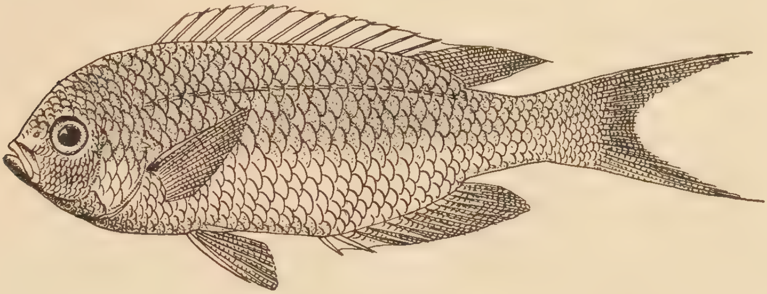

Fig. 44. *Daya jerdoni* (Day). n.s.

Distribution: that of the single species known.

Note. *Pomacentrus formosanus* Fowler & Bean from Formosa has been considered by Whitley as belonging to *Daya* (Rec. Austr. Mus. XVI, 1928, p. 220). Although this species does not fit into the genus *Pomacentrus* (D. X. 12. Sq. l. 47), it only superficially resembles *Daya jerdoni.*

1. **Daya jerdoni** (Day). (Fig. 44, p. 349)

Pomacentrus jerdoni Day, Proc. Zool. Soc. London 1873, p. 237. — Fishes of India, Part III, 1877, p. 383.

Pomacentrus jerdoni Evermann & Seale, Bull. Bur. Fish. XXVI, (1906) 1907, p. 89.

Daya jerdoni M. Weber, Siboga Exp. Fische 1913, p. 344.

Daya jerdoni McCulloch, Mem. Queensl. Mus. VII, Part III, 1921, p. 170.

Daya jerdoni var. *fusca* McCulloch, ibid. p. 171.

Daya jerdoni Montalban, Bur. Sc. Manila Monogr. XXIV, 1927, p. 73.
Daya jerdoni Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 120.
Daya jerdoni Whitley, Mem. Queensl. Mus. IX, Part III, 1929, p. 239.

D. XIII. 12—13. A. II. 12—14. P. 2. 15. V. I. 5. Ll. 21 + 12. Ltr. $\begin{array}{c}4\\ \hline 1\\ \hline 10\end{array}$ Sq. l. 30—34.

Height 2.8, 3.9 in length with caudal. Head 3.7, 5 in length with caudal. Length of head 1.1 in its height. Eye 3.5, more than very convex interorbital space. Snout 1.3 in eye. Four transverse rows of scales on preopercle and a fifth row on inferior limb. Dorsal spines subequal, about as long as snout and half eye together; the membranes between the spines not incised. No notch between spinous and soft dorsal, which is pointed, the longest rays equal to head without snout. First anal spine almost as long as second, which equals the dorsal spines in length. Soft anal similar to soft dorsal. Ventrals about half length of snout shorter than head. Pectorals slightly longer, but not as long as head. Caudal deeply forked, the lobes pointed. Colour of preserved specimen bluish above, creamy below, with a silvery hue all over, most marked on opercle. Fins pinkish, spinous dorsal dusky along its edge. A dark spot superiorly at base of pectoral. Length 150 mm.

Habitat: Borneo Bank!; Sulu Islands. — Persian Gulf, Coast of British India, Philippines, Coasts of Queensland and New South Wales. In sea.

4. **Cheiloprion** M. Weber

(M. Weber, Siboga Exp. Fische, 1913, p. 342)

Ovoid, compressed. Mouth horizontal. Lips much developed, fleshy, fimbriate, with many furrows, curled back over snout, so as to expose the teeth, which are long, needlelike, the tips rounded, and placed in two rows. The teeth of both rows equal in length. Preorbital and suborbital scaleless, with a rugose or finely denticulated lower free border. The suborbital narrow, tapering posteriorly. All opercular bones entire, excepting the preopercle, which has some low, blunt, and very small denticulations along its hindborder. All opercular bones scaly. Scales on head reaching to nostrils. 26 scales between gillopening and base of caudal. Lateral line developed in its anterior part as tubes, on caudal peduncle as rather indistinct pores. Scaly sheaths on vertical fins well developed. Dorsal consisting of XIII spines and 13 rays. Anal with II spines and 12 rays. Pectorals and ventrals pointed. Caudal emarginate, the lobes rounded.

Distribution: that of the single species known.

1. **Cheiloprion labiatus** (Day) (Fig. 45, p. 351)

Pomacentrus labiatus Day, Fishes of India, Part III, 1877, p. 384.
Cheiloprion labiatus M. Weber, Siboga Exp. Fische, 1913, p. 342.
Cheiloprion labiatus Fowler, Proc. Acad. Nat. Sc. Philadelphia LXX, 1918, p. 53.
Cheiloprion labiatus Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 36.
Cheiloprion labiatus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 64.

D. XIII. 13. A. II. 12. P. 2. 16. V. I. 5. Ll. 17—18 + 8—9. Ltr. $\begin{array}{c}1\frac{1}{2}-2\\ \hline 1\\ \hline 9\end{array}$. Sq. l. 26.

Height 2, 2.3 in length with caudal. Head 2.9, 3.4 in length with caudal. Length of head 1.2 in its height. Eye 3.6, slightly more than snout and 1.2 in convex interorbital space. About 3 transverse rows of scales on preopercle and a fourth row on inferior limb. First dorsal spine equal to eye, following spines increasing in length to the 7th which is equal to postorbital part of head; 8th to 13th spines subequal, slightly shorter than 7th. Membranes between the spines

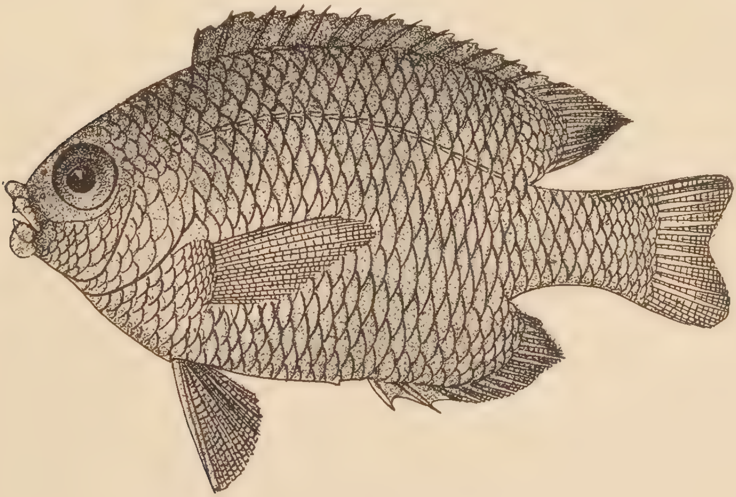

Fig. 45. *Cheiloprion labiatus* (Day). × 1½.

somewhat incised. Soft dorsal pointed, the longest rays about equal to head without snout. First anal spine half as long as second, which equals longest dorsal spines. Soft anal similar to soft dorsal. Pectorals and ventrals subequal, as long as head without snout. Caudal emarginate, the lobes rounded. Colour of preserved specimen light brown, dorsal, anal, and ventrals darker. Length 85 mm.

Habitat. Karakelang!; Sulu Islands; Ambon. — Andamans, Nicobars, Philippines, Solomon Islands, New Hebrides, Samoa. In sea.

5. **Pomacentrus** Lacepède

(Lacepède, Hist. Nat. Poissons IV, 1803, p. 505)

Pristotis Rüppell, Neue Wirbelthiere, Fische, 1835, p. 128.
Dischistodus Gill, Proc. Acad. Nat. Sc. Philadelphia 1863, p. 214.
Parapomacentrus Bleeker, Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 65.
Amblypomacentrus Bleeker, ibid. p. 68.
Eupomacentrus Bleeker, ibid. p. 73.

Oblong or somewhat elongate, compressed. Scales rather large, less than 30 transverse series between gillopening and caudal. Head scaly, the scales on upper part of head reaching to end of snout, to nostrils or to interorbital space. Cheeks scaly. Vertical fins with a scaly sheath, which often covers a great part of the fins. Mouth moderate or small, slightly protractile. Teeth compressed, more or less incisiviform, the edges truncate or rounded, in one or two series in the jaws; the inner row, if present, often formed by shorter and more slender teeth. Hindborder of preopercle serrated. Preorbital and suborbital serrated or not. Operculum with one or two flat spines. Lateral line formed by tubes in its anterior part, which runs parallel to the profile of the back and ends below posterior part of dorsal, sometimes continued for a few scales as pores. The lateral line is again developed on the tail as a row of pores, sometimes very indistinct. Rarely the two parts of the lateral line are connected by scales bearing pores. Dorsal consisting of XII—XIV spines and 10—20 soft rays. Anal with II spines and 10—16 soft rays. Pectorals rounded. Ventrals generally pointed, the first ray sometimes produced into a short filament. Caudal emarginate or forked, the lobes sometimes pointed and filamentous.

Distribution. Tropical and subtropical parts of Atlantic, Pacific, Indic, and the Red Sea. On reefs and in rockpools, some species entering fresh water.

Note. As has already been observed by Günther the serrature of the preopercle and the pre- and suborbitals are very indistinct or even absent in the young stages of those species, which have these bones strongly serrated in adults. It is therefore often impossible to identify young specimens.

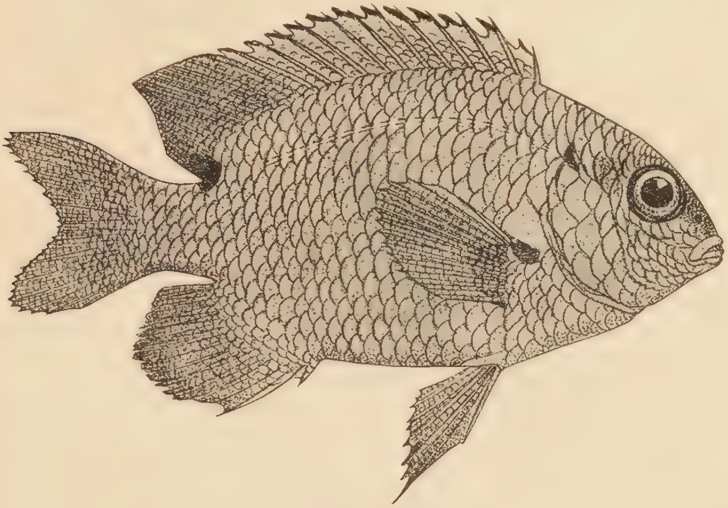

Fig. 46. *Pomacentrus nigricans* (Lac.). n.s.

Key to the Indo-australian species of Pomacentrus

I. Twelve dorsal spines. Suborbital scaly. Scales on head reaching to nostrils or beyond.
  a. Preorbital and suborbital deep, their depth one or three fourths diameter of eye . . . . 1. *P. lividus* p. 356.
  b. Preorbital and suborbital low, their depth less than half diameter of eye. . 2. *P. nigricans* p. 357.
II. Thirteen dorsal spines, rarely fourteen.
  A. Suborbital scaly.
    a. Lower border of suborbital smooth in adults. Caudal deeply forked, the lobes pointed. Snout scaly.
      a'. Two rows of scales on preopercle and a third row on inferior limb. Caudal bordered by dark above and below . . . . 3. *P. cyanomos* p. 360.
      b'. Three rows of scales on preopercle and a fourth row on inferior limb.

a^2. Caudal bordered by dark above and below . . . . 4. *P. taeniurus* p. 361.

b^2. Caudal uniform . . . . 5. *P. violascens* p. 362.

b. Lower border of suborbital with one or more denticulations. Caudal emarginate. Snout scaly. Large black blotch at base of pectoral, the axil of which is also black. . . . . . 6. *P. philippinus* p. 363.

B. Suborbital naked.

a. A patch of scales on preorbital. Snout scaly . . . . 7. *P. littoralis* p. 364.

b. Preorbital without scales.

a'. No notch between pre- and suborbital, the lower borders of which are smooth.

a^2. Scales reaching to nostrils. Dark and light blotches on opercle and dark bands longitudinally at the caudal . . . 8. *P. smithi* p. 366.

b^2. Scales reaching to interorbital space.

a^3. Body with two transverse bands . . . . 9. *P. bifasciatus* p. 367.

b^3. Body with five transverse bands . . . . 10. *P. annulatus* p. 368.

b'. No notch between pre- and suborbital, the lower border of suborbital denticulated.

a^2. Snout naked. Caudal deeply forked, the lobes pointed and more or less filamentous. Teeth in one row. . . . . 11. *P. breviceps* p. 368.

b^2. Snout naked. Caudal forked. Teeth in two rows. Second anal spine equal to postorbital part of head.

a^3. Three dark patches on back. Anus black . . . . 12. *P. perspicillatus* p. 370.

b^3. A large black blotch at base of pectoral. Anus black. . 13. *P. prosopotaenia* p. 372.

c^3. Four transverse bands on body. Scales behind superior part of opercle with black dots . . . . 14. *P. fasciatus* p. 373.

d^3. A light blotch between dorsal and lateral line. . . 15. *P. chrysopoecilus* p. 375.

c^2. Snout scaly. Second anal spine equal to head without snout. Teeth in two rows . . . . . . 16. *P. notophthalmus* p. 377.

d^2. Snout scaly. Second anal spine equal to postorbital part of head. Fourteen dorsal spines. Posteriorly dark blotches on anal . . . . 17. *P. stigma* p. 379.

c'. A notch between pre- and suborbital. Snout scaly.

a^2. Denticulations of suborbital feeble or absent in adults.

a^3. Notch between pre- and suborbital feeble. Caudal forked. Scales of body and head with margaritaceous spots. A large black blotch at base of pectoral. Three transverse rows of scales on preopercle and one row on inferior limb . . . . . 18. *P. melanochir* p. 379.

b^3. Head, body, and fins uniform. Caudal slightly forked. A black band along base of pectoral. Two transverse rows of scales on preopercle and one row on inferior limb . . . . 19. *P. melanopterus* p. 380.

c^3. Head and body uniform Anal dark, posterior part light. A dark patch at base of pectoral. Three transverse rows of scales on preopercle and one on inferior limb . . . . 20. *P. nigromanus* p. 381.

d^3. Anal with a dark brown edge and a light band, continued anteriorly on body to base of ventrals. . . . 21. *P. moluccensis* p. 382.

e^3. Uniform brown. A small dark spot at pectoral origin. 22. *P. reidi* p. 384.

b^2. Denticulations of suborbital strong in adults.

a^3. Caudal forked, the lobes pointed. Scales of head and body with light spots or stripes. Two transverse rows of scales on preopercle and one on inferior limb. . .23. *P. pavo* p. 385.

b^3. Caudal slightly forked. Posterior part of body with light spots. Two narrow longitudinal white bands on anal. An ocellus may be present on soft dorsal. . . 24. *P. amboinensis* p. 387.

c^3. Caudal forked, the lobes

rounded in adults. Generally a dark spot at origin of lateral line, on posterior part of dorsal or on caudal peduncle, and at base of pectoral . . . . 25. *P. tripunctatus* p. 388.

1. **Pomacentrus lividus** (Bl. Schn.)

Chaetodon lividus Bloch Schneider, Syst. Ichth. 1801, p. 235.
Pomacentrus punctatus Quoy & Gaimard, Voyage de l'Uranie et de la Physicienne, Zool. 1824, p. 395.
Pomacentrus punctatus Cuvier & Valenciennes, Hist. Nat. Poissons V, 1830, p. 429.
Chaetodon lividus Lichtenstein, Forster, Descr. Animal, 1844, p. 227.
Pomacentrus prosopotaenioïdes Bleeker, Nat. Tijdschr. Ned. Indië III, 1852, p. 286.
Pomacentrus punctatus Kner, Novara Exp. Fische I, 1865, p. 242.
Pomacentrus punctatus Day, Fishes of India, Part III, 1877, p. 384.
Eupomacentrus lividus Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 73. — Atl. Ichth. IX, 1877, Tab. 403, fig. 5.
Pomacentrus lividus Günther, Fische der Südsee II, 1881, p. 228.
Pomacentrus lividus Day, Fishes of India, Suppl. 1888, p. 801.
Pomacentrus lividus Sauvage, Poissons de Madagascar 1891, p. 426.
Pomacentrus punctatus Seale, Occas. Papers B. P. Bishop Mus. I, N⁰ 3, 1901, p. 80.
Pomacentrus lividus Jordan & Seale, Bull. Bur. Fish. XXV, (1905) 1906, p. 283.
Pomacentrus lividus Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 39.
Pomacentrus lividus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 117.
Pomacentrus lividus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 313.
Pomacentrus lividus Herre, Field Mus. Nat. Hist. Zool. Ser XXI, 1936, p. 277.

D. XII. 13—15 (16). A. II. 13. P. 2. 16—17. V. I. 5. Ll. 16—18 + 8—9. Ltr. $\dfrac{2}{\dfrac{1}{9-10}}$.

Height 2.1—2.2, 2.5—2.8 in length with caudal. Head 2.7—3, 3.3—3.9 in length with caudal. Length of head 1—1.1 in its height. Eye 3.4—4.1, 1—1.3 in snout and 1—1.2 in convex interorbital space. Mouth oblique. Maxillary reaching to below nostril. Teeth truncate, in a single crowded row. Posterior part of lower border of preorbital and total lower border of suborbital strongly denticulated in adults. Preorbital without scales, rugose or papillated in adults. Suborbital scaly. Anterior part of suborbital and posterior part of preorbital of same depth, which is equal to eye in adults and about three fourths of eye in young. Suborbital rapidly decreasing in depth posteriorly, its lower border therefore very oblique. Three transverse rows of scales on preopercle, the inferior and posterior limb naked. Posterior border of preopercle distinctly denticulated, in large specimens the denticulations are coarser. Scales on upper part of head reaching on snout but not as far as nostrils. Dorsal spines slightly increasing in length posteriorly, the last one equal to snout in large specimens, in smaller specimens equal to snout and eye together. The membranes between the spines not incised. Soft dorsal pointed, the longest rays equal to snout and eye in large specimens, in smaller specimens half length of snout shorter than head. First anal spine less than half length of second, which is about equal to longest dorsal spine. Dorsal and anal with a high scaly sheath. Pectorals with a scaly base, equal to head without snout in adults, half length of snout shorter than head in young ones. Ventrals with the first ray not or slightly produced, about as long as pectorals. Caudal forked, the lobes rounded. Colour of preserved specimens dark or light brown, most of the scales of head, body, tail, and the scaly sheaths of the fins with a white spot. A dark blotch or white edged ocellus at base of posterior dorsal rays. Fins dark brown or light yellowish. Length 160 mm.

Habitat: Singapore; Sumatra (Padang!); Java (Malang); Duizend Islands!; Celebes (Gorontalo); Sangi Islands; Sula Islands!; Batjan; Gomomo Island; Buru; Ceram; Ambon; Goram; Lomblen!. — Madagascar, Zanzibar, Mauritius, Maldives, Andamans, Nicobars, Cocos Keeling Islands, Philippines, Pelew Islands, Marianas, Carolines, Solomon Islands, Nauru, New Hebrides, Marcus Island, North Australia, Fiji, Samoa, Society Islands.

Note. *P. punctatus* has been recorded from the Red Sea, but Rüppell (Atlas Reise N. Afrika, Fische 1828, p. 37), Klunzinger (Verh. zool. bot. Ges. Wien XXI, 1871, p. 522), and Kosmann & Räuber (Verh. Naturh. Med. Vereins Heidelberg I, 1876, p. 32) describe specimens with thirteen dorsal spines. Although it may be possible that specimens from the Western part of the range of this species have one spine more in the dorsal fin, I have omitted the references to the Red Sea specimens from the synonymy.

2. **Pomacentrus nigricans** (Lac.) (Fig. 46, p. 353)

Holocentrus nigricans Lacepède, Hist. Nat. Poissons IV, 1803, p. 332, p. 367.

?*Pomacentrus scolopseus* Quoy & Gaimard, Voyage de l'Uranie et de la Physicienne, Zool. 1824, p. 398.

Pomacentrus taeniops Cuvier & Valenciennes, Hist. Nat. Poissons V, 1830, p. 423.

Pomacentrus taeniops Lesson, Voyage Coquille. Poissons II, 1830, p. 190.

?*Pomacentrus albifasciatus* Schlegel & Müller, Verh. nat. gesch. Ned. overz. Bezitt. Zool. 1839—1841, Overzigt Amphiprion etc. p. 21.

Pomacentrus cyanospilus Bleeker, Nat. Tijdschr. Ned. Indië III, 1852, p. 709.

Pomacentrus leucopleura Bleeker, ibid. VII, 1854, p. 85.

Pomacentrus scolopsis Günther, Cat. Brit. Mus. IV, 1862, p. 28.

Eupomacentrus (*Eupomacentrus*) *lividus* Bleeker, Ver. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 73 (partim).

Eupomacentrus (*Brachypomacentrus*) *albifasciatus* Bleeker, ibid. p. 75. — Atl. Ichth. IX, 1877, Tab. 403, fig. 6.

Pomacentrus scolopsis Günther, Fische der Südsee II, 1881, p. 227.

Pomacentrus subniger De Vis, Proc. Linn. Soc. New S. Wales IX, Part IV, 1885, p. 873.

Pomacentrus scolopsis var. *albofasciatus* Steindachner, Abh. Senckenb. naturf. Ges. XXV, 1901, p. 439.

?*Pomacentrus cyanospilus* Johnstone, Pearl Oyster Rep. II, Fishes, 1904, p. 212.

Pomacentrus scolopsis Steindachner, Sitzber. Akad. Wien CXV, 1906, p. 1397.

Pomacentrus nigricans Jordan & Seale, Bull. Bur. Fish. XXV, (1905) 1906, p. 281.

Pomacentrus albofasciatus Jordan & Seale, ibid. p. 282.

Pomacentrus nigricans Jordan & Richardson ibid. XXVII, (1907) 1908, p. 262.

Pomacentrus albofasciatus Jordan & Richardson l.c.

Pomacentrus albofasciatus M. Weber, Siboga Exp. Fische 1913, p. 339.

Pomacentrus lividus M. Weber ibid. p. 340 (nec Bl. Schn.).

Pomacentrus albofasciatus Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 40.

Pomacentrus nigricans Montalban, ibid. p. 41.

Pomacentrus albifasciatus Whitley, Rec. Austr. Mus. XVI, 1927, p. 19.

Pomacentrus nigricans Fowler & Bean, Bull. U. S. Nat. Mus. 100, Vol. VII, 1928, p. 118.

Pomacentrus nigricans Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 313.

Pomacentrus albofasciatus Fowler, ibid. p. 314.

Eupomacentrus nigricans Whitley, Mem. Queensl. Mus. IX, Part III, 1929, p. 224, p. 238.

Brachypomacentrus albifasciatus Whitley, ibid. p. 238.

Eupomacentrus nigricans var. *subniger* McCulloch, Check-list Fishes Austr. Part II, 1929, p. 296.

Pomacentrus albofasciatus Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 276.

Pomacentrus nigricans Herre, ibid. p. 278.

D. XII. 14—16. A. II. 12—13 (14). P. 2. 17—18. V. I. 5. Ll. 19—21 + 8—10. Ltr. $\begin{array}{c} 2—2\frac{1}{2} \\ \hline 1 \\ \hline 9—10 \end{array}$ Sq. l. 26—29.

Height 1.9—2.3, 2.3—3.1 in length with caudal. Head 3—3.2, 3.6—4.4 in length with caudal. Length of head 1—1.2 in its height.

Eye 2.6—3.8, equal to or somewhat more than snout and than slightly convex interorbital space. Mouth oblique. Maxillary reaching beyond vertical through nostril, and almost to below frontborder of eye. Teeth truncate, in a single crowded row. Posterior part of lower border of preorbital and total lower border of suborbital strongly denticulated in adults. Suborbital and posterior part of preorbital scaly. Anterior part of suborbital and posterior part of preorbital of same depth, which is less than half diameter of eye. Three transverse rows of scales on preopercle, the inferior and posterior limbs naked. Posterior border of preopercle strongly denticulated in adults. Scales on upper part of head reaching to nostrils or slightly farther. Dorsal spines slightly increasing in length posteriorly, the last equal to snout and half eye. Membranes between the spines incised. Soft dorsal pointed, the median rays longest, and equal to head without snout. First anal spine less than half length of second, which is longer and stronger than dorsal spines and equal to postorbital part of head or somewhat longer. Anal rounded or slightly pointed, the longest rays as long as or somewhat longer than longest dorsal rays. Dorsal and anal with a deep and thick scaly sheath. Pectorals with a scaly base, more than head without snout. Ventrals with the first ray produced, as long as head. Caudal forked, the lobes rounded. Colour of preserved specimens dark or light brown. A white stripe from snout over preorbital and suborbital. Scales of preopercle and of opercle each with a white spot. Similar white spots on scales of lower part of body, especially developed above anal and on anal sheath. A black, generally white edged ocellus on base of posterior dorsal rays. A black blotch superiorly at base of pectoral, the axil of which is also black. Many specimens with a broad whitish transverse band, running from posterior part of spinous dorsal to anterior part of anal. Dorsal dark or light brown, the anterior part generally darker. Anal dark brown, often with a broad indistinct lighter subterminal longitudinal band. Caudal and pectorals light yellowish or dark brown. Length 150 mm.

Habitat: Sumatra (Ulakan); Nias; Batu Islands; Banka; Kabala Dua, Borneo Bank!; Muaras Reef!; Talaut Islands!; Celebes (Menado, Tombariri); Flores!; Timor!; Salomakië!; Gomomo Island; Batjan; Sula Islands!; Buru; Ceram; Saparua; Banda!; New Guinea (North Coast). — China, Riu Kiu Islands, Formosa, Philippines, Pelew Islands, Bonin Island, Carolines, Guam, Solomon Islands, New Hebrides, North Australia, Fiji, Samoa, Marquesas Islands, Fanning Islands, Tonga Islands, Society Islands, Paumotu Islands, Laysan. In sea, on reefs.

3. **Pomacentrus cyanomos** Blkr.

Pomacentrus cyanomos Bleeker, Nat. Tijdschr. Ned. Indië XI, 1856, p. 89.
Pomacentrus cyanomos Günther, Cat. Brit. Mus. IV, 1862, p. 21.
Pomacentrus (*Pomacentrus*) *cyanomos* Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 45. — Tab. 408, fig. 3.

D. XIII. 11. A. II. 11. P. 2. 15. V. I. 5. Ll. 17 + 11. Ltr. $\begin{array}{c}3\\\hline 1\\\hline 10\end{array}$. Sq. l. 26.

Height 2.5, 3.3 in length with caudal. Head 3.4, 4.5 in length with caudal. Length of head 1.1 in its height. Eye 3. Snout short, 1.4 in eye. Interorbital space slightly convex, 1.1 in eye. Mouth oblique. Maxillary reaching to below frontborder of eye. Teeth in two rows, those of the outer row truncate, crowded, those of the inner row much shorter and more slender and pointed. Preorbital and suborbital with a smooth edge, scaly. Preopercle with blunt denticulations along its hindborder and with two transverse rows of scales and a third one on inferior limb. Posterior limb scaly. A patch of scales posteriorly on lower side of lower jaw. Upper part of head scaly to between nostrils. Dorsal spines gradually increasing in length posteriorly, the last one equal to snout and half diameter of eye together. Soft dorsal and anal much pointed, the longest rays as long as head or longer. First anal spine less than half length of second, which is rather strong and equal to snout and eye together. Ventrals with the first ray produced, about as long as head. Pectorals somewhat shorter. Caudal forked. Colour of preserved specimen silvery with a violet hue, darker above. A dark brown blotch at origin of lateral line. A dark brown triangular patch at base of pectoral, the axil of which is of the same colour. Dorsal and anal dark violet, a white patch at base of the six or seven last dorsal rays. Caudal dark violet, the outer upper and lower ray and the median rays light. Pectorals dusky. Ventrals dark violet, the spine and the first ray light. Length 106 mm.

Habitat: Sumatra (Benkulen); Simalur!; Nias; Java (Batavia!); Ceram; New Guinea (Papua). — Ceylon, Japan, New Hebrides.

Note. The habitat Japan is based on a record of Von Martens (Exp. Ost-Asien, Zool. I, 1876, p. 396), who mentions this species from Yokohama. As it has never been found there since and as the list of Von Martens contains more mistakes I doubt its occurrence in Japan. Possibly the specimen belongs to *P. violascens*, which is known to occur at Yokohama.

4. **Pomacentrus taeniurus** Blkr.

Pomacentrus taeniurus Bleeker, Acta Soc. Sc. Indo-Neerl. I, 1856. Beschr. Vischs. Amboina, p. 51.

Glyphidodon amboinensis Bleeker, ibid. II, 1857. Achtste Bijdr. Vischf. Amboina, p. 72.

Pomacentrus taeniurus Günther, Cat. Brit. Mus. IV, 1862, p. 22.

Pomacentrus (*Pomacentrus*) *taeniurus* Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 47. — Atl. Ichth. IX, 1877, Tab. 408, fig. 2.

Pomacentrus taeniurus Macleay, Proc. Linn. Soc. New S. Wales IX, 1884, p. 44.

Glyphidodon amboinensis Jatzow & Lenz, Abh. Senckenb. naturf. Ges. XXI, 1899, p. 519.

Pomacentrus leucosphyrus Fowler, Journ. Acad. Nat. Sc. Philadelphia (2) XII, Part 4, 1904, p. 533.

Pomacentrus taeniurus Evermann & Seale, Bull. Bur. Fish. XXVI, (1906) 1907, p. 89.

Pomacentrus taeniurus M. Weber, Siboga Exp. Fische 1913, p. 337.

Pomacentrus taeniurus Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 46.

Pomacentrus taeniurus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 72 (sine syn.).

Pomacentrus taeniurus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 310.

Pomacentrus taeniurus McCulloch, Mem. Austr. Mus. V, 1929, p. 293 (sine syn.).

Pomacentrus taeniurus Whitley, Mem. Queensl. Mus. IX, Part III, 1929, p. 236 (sine syn.).

Pomacentrus taeniurus Hora & Mukerji, Rec. Indian Mus. XXXVIII, Art. 1, 1936, p. 28.

D. XIII. 11. A. II. 11. V. I. 5. Ll. 18 (+ 4) + (1 + 10). Ltr. $\begin{array}{c}2\\\hline 1\\\hline 9\end{array}$.

Height 2.2, 3 in length with caudal. Head 3.3, 4.5 in length with caudal. Height of head equal to its length. Eye 3.4, 1.1 in somewhat convex interorbital space. Snout blunt, 1.5 in eye. Mouth oblique. Maxillary reaching to below frontborder of eye. Teeth truncate, in an irregular row in both jaws. Preorbital and suborbital scaly, their edge smooth. Hindborder of preopercle with some minute denticulations, more distinct at the angle. Three transverse rows of scales on the preopercle and one on inferior limb. A very narrow posterior limb naked. Posterior part of lower jaw scaly. Scales on upper part of head reaching to between nostrils. Dorsal spines slightly increasing in size posteriorly, the last one slightly more than eye and snout together. Soft dorsal and anal much pointed, the longest rays equal to head, the 5th and 6th dorsal rays filamentous and much longer. First anal spine one third of second, which almost equals head without snout. Ventrals with the first ray produced, equal to head. Pectorals slightly shorter. Caudal deeply forked, the lobes produced into filaments. Colour of preserved specimens brownish. Scales of belly, sides, and tail with more or less distinct bluish white spots. A small dark brown spot at origin of lateral line. Fins brownish, posterior dorsal rays and median caudal rays hyaline. Length 112 mm.

Habitat: Singapore; Sumatra (Padang!); Biliton; Postillon Islands!; Buru; Ambon; New Guinea (Mouth of Mbai River!). — Zanzibar, Coast of Burma, Philippines, Japan?, Coast of Queensland, New Hebrides. In sea and estuaries.

Note. Karoli (Termeszetrajzi Füzetek V, 1882, p. 27) whose localities are often erroneous, records a specimen from Japan, where this species has never been found since. Several authors unite *cyanomos* with this species. It can however be recognised by having only 2 transverse rows of scales on the preopercle.

5. **Pomacentrus violascens** (Blkr.)

Pristotis violascens Bleeker, Journ. Ind. Arch. II, 1848, p. 637.
Dascyllus xanthurus Bleeker, Nat. Tijdschr. Ned. Indië IV, 1853, p. 117.
Pomacentrus violascens Bleeker, ibid. XII, 1856, p. 222.
Pomacentrus violascens Günther, Cat. Brit. Mus. IV, 1862, p. 20.
Tetradrachmum xanthurus Bleeker, Ned. Tijdschr. Dierk. I, 1863, p. 250.
Pomacentrus (Pomacentrus) violascens Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 46. — Atl. Ichth. IX, 1877, Tab. 408, fig. 6.
Pomacentrus rathbuni Jordan & Snyder, Proc. U. S. Nat. Mus. XXIII (1900) 1901, p. 754.
Pomacentrus violascens Jordan & Snyder, ibid. XXIV (1901) 1902, p. 601.
Pomacentrus violascens Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 44.
Pomacentrus violescens Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 71.
Pomacentrus violascens P. J. Schmidt, Trans. Pacif. Comm. Ac. Sc. USSR 1, 1930, p. 65.
Pomacentrus violascens Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 281.
Pomacentrus violascens Fowler, Hongkong Naturalist VI. Suppl. 1938, p. 38.

D. XIII. 11. A. II. 10 (11). P. 2. 14. V. I. 5. Ll. 17. Ltr. $\dfrac{\overset{2}{\overline{1}}}{9}$. Sq. l. 26.

Height 2.5, 3.3 in length with caudal. Head 3.3, 4.4 in length with caudal. Height of head equal to its length. Eye 3.3, slightly more than somewhat convex interorbital space. Snout blunt, 1.5 in eye. Mouth oblique. Maxillary reaching to below frontborder of pupil. Teeth in 3 rows, those of the outer row truncate or somewhat rounded, those of the inner row much more slender, and shorter. Preorbital and suborbital with a smooth edge, scaly. Preopercle finely denticulated along its hindborder, with two and a half or three transverse rows of scales and with another on inferior limb. Posterior limb scaly. Lower jaw scaly posteriorly. Upper part of head scaly to between nostrils. Dorsal spines slightly increasing in length posteriorly, the last equal to snout and eye together. Soft dorsal and anal much pointed, the longest rays about equal to head without snout. The fourth and fifth dorsal rays prolonged into a long filament and much longer than head. First anal spine half length of second, which is rather strong, and a little more than eye and snout together. Pectorals as long as head without snout. Ventrals with the first ray produced, as long as head. Caudal deeply forked, the lobes produced into long filaments. Colour of preserved specimens brownish, fading to yellow on posterior part of caudal peduncle. A dark blotch at origin of lateral line. Dorsal and anal brownish, but the posterior half of the soft dorsal hyaline. Caudal yellowish hyaline. Pectorals and ventrals brownish. Sometimes the axil of the pectoral is black. Length 92 mm.

Habitat: Singapore; Sumatra (Padang!); Nias; Postillon Islands!; Sumbawa; Flores; Buru; Ceram; Ambon. — Tonkin, China, Japan, Philippines, New Hebrides. In sea.

6. **Pomacentrus philippinus** Evermann & Seale

Pomacentrus philippinus Evermann & Seale, Bull. Bur. Fish. XXVI (1906) 1907, p. 91.

Pomacentrus philippinus Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 48.

Pomacentrus ovoides Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 112 (nec Cartier).

D. XIII. 13—14. A. II. 13—14. Sq. l. 26. $\begin{array}{c}3\text{—}4\\ \hline 1\\ \hline 9\end{array}$.

Height 2—2⅛. Head 3¼—4. Snout 4—4⅛ in head. Eye 2⅞—3, 1.1 in interorbital space, greater than snout or interorbital space in young. Maxillary reaches little beyond front of eye. Teeth uniserial, compressed, ends rounded or obtuse. Interorbital space 2⅞—3 in head, broadly convex. Suborbital with one narrow row of scales, an obtuse spine in front, rest of edge entire or with a few denticulations. Two transverse rows of scales on preopercle, and one row on inferior limb. Scales on upper part of head reaching to near end of snout. Length of anterior dorsal spines 4¾, of longest spine 1¾ in head. Membranes between the dorsal spines deeply incised. Soft dorsal pointed. Middle ray of dorsal longest, equal to head. Second anal spine 2.45 in head. Soft anal similar to soft dorsal. Ventrals pointed, subequal to pectorals and about as long as head. Caudal emarginate. Colour of preserved specimens dark brown, caudal and distal part of caudal peduncle light yellow. A light streak on each scale. Dorsal and anal dark, except posterior parts of both fins, which are yellow and strongly contrasting. Pectorals brown, with a large black blotch at base and on pectoral axil, surrounded by a light area. Ventrals blackish. Length 98 mm (Compiled, not seen by me).

Habitat: Buru; Tidore. — Paracel Islands, Philippines, Queensland, New Caledonia.

Note. Fowler & Bean have united this species with *Pomacentrus ovoides* Cartier (Verh. phys. med. Ges. Würzburg V, 1874, p. 98). This species however has the suborbital entire and the caudal forked with filamentous lobes. Nothing is said about scales on the suborbital. According to Cartier's description the colouring of the dorsal and anal is also different. Cartier says that the fins are brown and that the dorsal and anal are lighter at the base, especially posteriorly, with indications of whitish spots. *P. ovoides* must therefore be another species, perhaps near *breviceps,* as suggested by Bleeker (Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 70) and Montalban (Monogr. Bur. Sc. Manila XXIV, 1927, p. 70). Chevey (Invent. faune ichth. Indochine, 19e note, 1932, p. 25) has recorded *ovoides* from Paracel Islands and Borodin (Bull. Vanderbilt Marine Mus. I, Art. 3, 1932, p. 92) from Ingram Island, Queensland and Noumea, New Caledonia. I have included these localities in the habitat, as I suppose that both authors have based their determinations on the description given by Fowler & Bean.

7. **Pomacentrus littoralis** C. V.

Pomacentrus littoralis Cuvier & Valenciennes, Hist. Nat. Poissons V, 1830, p. 425.
Pomacentrus littoralis Schlegel & Müller, Verh. nat. gesch. Ned. overz. Bezitt. Zool. II, 1839—1841, Overzigt Amphiprion etc., p. 20.
Pomacentrus littoralis Bleeker, Nat. Tijdschr. Ned. Indië IV, 1853, p. 483.
Pomacentrus littoralis Günther, Cat. Brit. Mus. IV, 1862, p. 32.
Pomacentrus (Pseudopomacentrus) littoralis Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 53. — Atl. Ichth. IX, 1877, Tab. 404, fig. 8.
Pomacentrus littoralis Day, Fishes of India, Part III, 1877, p. 383 (partim?).

Pomacentrus littoralis Klunzinger, Sitzber. Akad. Wien, 1880, p. 397 (partim?).
Pomacentrus littoralis Günther, Fische der Südsee II, 1881, p. 228.
Pomacentrus littoralis Macleay, Descr. Cat. Austr. Fish. II, 1881, p. 62.
?*Pomacentrus littoralis* Sauvage, Poissons de Madagascar, 1891, p. 426.
Pomacentrus littoralis Jordan & Seale, Bull. Bur. Fish. XXV (1905) 1906, p. 281.
?*Pomacentrus littoralis* Jordan & Richardson, ibid. XXVII (1907) 1908, p. 263.
Pomacentrus burroughi Fowler, Proc. Acad. Nat. Sc. Philadelphia LXX, 1918, p. 48.
Pomacentrus littoralis Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 76 (sine syn.).
Pomacentrus littoralis Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 311.
Pseudopomacentrus littoralis Whitley, Mem. Queensl. Mus. IX, Part III, 1929, p. 236.
Pseudopomacentrus littoralis McCulloch, Checklist Fish. Austr. Part II, 1929, p. 294.
Pomacentrus littoralis Duncker & Mohr, Mitt. Zool. Mus. Hamburg XLIV, 1929, p. 67.
Pomacentrus littoralis Fowler, Proc. Acad. Nat. Sc. Philadelphia LXXXVI, 1934, p. 77.
Pomacentrus littoralis Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 285.

D. XIII. 13—14 (15). A. II. 14—15. P. 2. 15—16. V. I. 5. Ll. 17—18 + 8—9. Ltr. $\dfrac{\dfrac{2-2\frac{1}{2}}{1}}{10}$.

Height 1.8—2, 2.3—2.7 in length with caudal. Head 3.2—3.3, 4—4.3 in length with caudal.Length of head 1.2—1.3 in its height. Eye 3.5—3.6, 1—1.1 in snout, and 1.1—1.3 in rather convex interorbital space. Mouth somewhat oblique. Maxillary reaching to vertical midway between nostril and frontborder of eye. Teeth with rounded tips, in two rows, those of the inner row shorter than those of the outer row. Preorbital ending posteriorly in a strong single or double spine, and with a patch of scales before eye. Suborbital much narrower, with a series of strong spines along its lower border. Posterior border of preopercle with a series of blunt but rather strong spines. Generally two, but occasionally three transverse rows of scales on preopercle, besides a row on inferior limb. A narrow posterior limb naked. Scales on upper part of head reaching to between nostrils. Dorsal spines slightly increasing in length posteriorly, the last spine equal to snout and eye together. Membranes between the spines deeply incised. Soft dorsal rounded or slightly pointed, the median rays longest and half length of snout shorter than head. First anal spine less than half length of second, which is equal to or somewhat shorter than last dorsal spine, but much stronger. Ventrals with the first ray produced about equal to length of head. Pectorals somewhat shorter. Caudal forked, the lobes rounded. Colour of preserved specimens mahogany brown. A dark band along base of pectorals and generally the scale below origin of lateral line also dark. Dorsal of the colour of the body, with a subterminal light longitudinal band on the spinous part of the fin, which is darker above this band. Anal and ventrals generally darker than the body. Caudal often fading into dusky in its distal part, otherwise of the colour of the body. Pectorals dusky. Length 127 mm.

Habitat: Singapore; Sumatra (Trussan); Java (Batavia!; Anjer); Bali; Celebes (Makassar!, Labuandata Bay, Buka Buka Island); Sulu Islands; Sangi Islands; Halmahera; Makian; Gomomo Island; Flores; Solor; Timor; Buru; Ambon. — Madagascar, Mauritius, Andamans, Nicobars, Burma, Siam, Annam, Indochina, Philippines, Carolines, New Britain, Solomon Islands, Coast of Queensland, New Hebrides, Society Islands. In sea.

8. **Pomacentrus smithi** Fowler & Bean

Pomacentrus smithi Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 75.

D. XIII. 12 (13). A. II. 13. Ll. 17—20 + 7—9. Ltr. $\begin{array}{c}3\\ \hline 1\\ \hline 9\end{array}$.

Depth $2^{1}/_{8}$ to $2^{1}/_{4}$; head $3^{1}/_{8}$ to $3^{1}/_{5}$. Snout $3^{2}/_{5}$ to $3^{4}/_{5}$. Eye $2^{3}/_{4}$ to $3^{4}/_{5}$, greater than snout and 1—$1^{1}/_{8}$ in broadly convex interorbital space. Maxillary reaching to eye or slightly beyond front eye edge in young. Teeth uniserial, compressed, form rather even cutting-edge with ends blunt or truncate. Preorbital and infraorbital narrow, not free, edges entire, scaleless. Cheek with 3 rows of scales of which lowest row smallest and on preopercle flange. Scales on head reaching slightly forward to nostril though not quite to snout edge. Thirteenth dorsal spine $1^{2}/_{3}$ to 2 in head, fourth ray $1^{2}/_{5}$ to $1^{3}/_{5}$. Caudal emarginate, lobes rather pointed. Deep brown generally, scales with vertical dusky streaks or bar basally. Head little paler below than above, also breast and belly, all sprinkled with obscure dusky dots producing soiled appearance. Several oblique whitish streaks with blackish-brown alternating irregular streaks, on opercles and humeral region. Also similar horizontal blackish-brown alternating streaks on caudal peduncle out on caudal base. Dorsal largely dusky-black, spinous fin with longitudinal greyish median band and soft fin with pale or greyish streak on each membrane. Anal dusky-black, with 3 longitudinal greyish or whitish bands uppermost at bases of last rays. Caudal brownish terminally. Paired fins pale brown, pectoral with dusky obscure blotch at origin and ends of ventrals dusky. Length 83 mm. (After Fowler & Bean, not seen by me).

Habitat: Halmahera. — Philippines. In sea.

9. **Pomacentrus bifasciatus** Blkr.

Pomacentrus bifasciatus Bleeker, Nat. Tijdschr. Ned. Indië VI, 1854, p. 330.
Pomacentrus bifasciatus Günther, Cat. Brit. Mus. IV, 1862, p. 18.
Pomacentrus bifasciatus Day, Fishes of India, Part III, 1877, p. 383.
Dischistodus bifasciatus Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 88. — Atl. Ichth. IX, 1877, Tab. 401, fig. 3.
Pomacentrus bifasciatus Günther, Fische der Südsee II, 1881, p. 226.
Pomacentrus bifasciatus M. Weber, Siboga Exp. Fische 1913, p. 341.
Pomacentrus bifasciatus Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 47.

D. XIII. 14 (15). A. II. 14. (15). P. 2. 15. V. I. 5. Ll. 17 + 9. Ltr. $\begin{array}{c}2\\ \hline 1\\ \hline 10\end{array}$. Sq. l. 28.

Height 1.9, 2.5 in length with caudal. Head 3.2, 4.1 in length with caudal. Length of head 1.2 in its height. Eye 3, slightly more than somewhat convex interorbital space. Snout 1.2 in eye. Mouth oblique. Maxillary reaching almost to below frontborder of eye. Preorbital and suborbital of same depth, scaleless, their lower borders entire. Three transverse rows of scales on preopercle, the posterior and inferior limbs naked. Hindborder of preopercle finely denticulated. Scales on upper part of head reaching a line connecting frontborders of eyes. Seventh to ninth dorsal spines slightly longer than the others, equal to eye and snout together in a juvenile specimen; in adults the posterior spines are the longest. Soft dorsal rounded. First anal spine slightly less than half length of second, which is equal to postorbital part of head. Soft anal similar to soft dorsal. Pectorals and ventrals subequal, slightly shorter than head. Caudal emarginate, the lobes rounded. Colour of preserved specimens yellowish brown. A broad transverse dark nuchal band tapering inferiorly and ending near upper border of opercle. A second band beginning on dorsal between the 7th—13th spines and tapering inferiorly. Fins otherwise yellowish. Length 62 mm.

Habitat: Bawean; Flores; Solor; Samau!; Timor; Buru; Ternate. — Andamans, Philippines, Pelew Islands, Boston Island, Duke of York Island. In sea.

10. **Pomacentrus annulatus** Peters

Pomacentrus annulatus Peters, Monatsber. Akad. Berlin, 1855, p. 455. — Arch. Naturgesch. XXI, 1855, p. 265.
Pomacentrus annulatus Günther, Cat. Brit. Mus. IV, 1862, p. 18.
Glyphidodon Westermani Bleeker, Versl. Akad. Amsterdam XV, 1863, p. 30.
Pomacentrus annulatus Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 520.
Dischistodus annulatus Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 89. — Atl. Ichth. IX, 1877, Tab. 401, fig. 2.
Pomacentrus annulatus Barnard, Ann. S. Afric. Mus. XXI, 1925—1927, p. 733.

D. XIII. 11—13. A. II. 12—13. P. 2. 14—15. V. I. 5. Sq l. 27—28. Ltr. $\begin{matrix}3\\ \underline{1}\\ 9\end{matrix}$.

Height about 2, 2.4—2.5 in length with caudal. Head 4. Eye 2.4—2.7. Mouth oblique. Teeth in two rows. No notch between preorbital and suborbital, which are scaleless and have smooth edges. Two transverse rows of scales on preopercle, the posterior and inferior limbs naked. Hindborder of preopercle with very small almost inconspicuous denticulations. Scales on upper part of head reaching to frontborder of eye. Median dorsal spines and median dorsal rays longest. Second anal spine longer than postorbital part of head. Soft anal similar to soft dorsal. Pectorals and ventrals about as long as head. Caudal slightly emarginate, the lobes rounded. Yellowish or whitish, with 5 transverse brown bands; the first through eye, the second from origin of dorsal to base of ventrals, the third from below 5th or 6th to 10th or 11th dorsal spines to pre anal region; the fourth from soft dorsal to soft anal and the fifth on caudal peduncle at base of caudal. Ventrals dusky, other fins yellowish. Length 70 mm. (After Bleeker, not seen by me).

Habitat: Java?. — Mozambique, Zanzibar, Red Sea. In sea.

Note. Bleeker described this species as *Glyphidodon Westermani* after specimens belonging to the old collections of the Royal Zoological Society "Natura Artis Magistra" of Amsterdam and said to have come from Java. Most probably this habitat is wrong, as the species has never been found in the eastern part of the Indic.

11. **Pomacentrus breviceps** (Schl. & Müller), (Fig. 47, p. 370)

Glyphisodon breviceps Schlegel & Müller, Verh. nat. gesch. Ned. overz. Bezitt. Zool. 1839—1841, Overzigt Amphiprion etc. p. 23.
Pristotis trifasciatus Bleeker, Journ. Ind. Arch. II, 1848, p. 637.

Pomacentrus nematopterus Bleeker, Nat. Tijdschr. Ned. Indië III, 1852, p. 285.

Pomacentrus trifasciatus Bleeker, ibid. XIX, 1859, p. 438.

Pomacentrus nematopterus Günther, Cat. Brit. Mus. IV, 1862, p. 18.

Amblypomacentrus breviceps Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 69. — Atl. Ichth. IX, 1877, Tab. 404, fig. 7.

Amblypomacentrus breviceps M. Weber, Siboga Exp. Fische 1913, p. 343.

Pomacentrus breviceps Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 68.

Pomacentrus breviceps Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 114.

Pomacentrus beauforti Fowler & Bean, ibid. p. 115.

D. XIII. 10—12. A. II. 12 (13). P. 2. 15. V. I. 5. Ll. 16—17 + 8—9. Ltr. $\begin{array}{c} 2-2\frac{1}{2} \\ \hline 1 \\ \hline 8-9 \end{array}$.

Height 2.4—2.6, 3.2—3.4 in length with caudal. Head 3.4—3.6, 4.4—4.9 in length with caudal. Length of head 1.1—1.2 in its height. Eye 3—3.2, equal to or slightly more than almost flat interorbital space. Snout short, 1.5—1.6 in eye. Mouth oblique. Maxillary not reaching to below frontborder of eye. Truncate teeth in a single crowded row in both jaws. A few much shorter and much more slender teeth may be present in the upper jaw, forming an inner series. Preorbital and suborbital scaleless, both bones of the same depth, their lower border finely denticulated. Two transverse rows of scales on preopercle, sometimes three irregular rows in its anterior part. Posterior and inferior preopercular limbs naked. Hindborder of preopercle very finely denticulated. Scales on upper part of head reaching to between eyes. Dorsal spines slightly increasing in length posteriorly, the last spine equal to snout and eye together. Soft dorsal much pointed, the 7th ray produced into a long filament, as long as head. First anal spine less than half length of second, which is equal to snout and half length of eye. Soft anal similar to soft dorsal, the 8th ray produced into a long filament. Pectorals equal to head without snout. Ventrals with the first ray produced into a filament, much longer than head. Caudal forked, the lobes pointed and produced into filaments. Colour of preserved specimens light brownish, lighter or silvery below. Most scales of operculum, body, and tail with a silvery spot. In young ones four rather broad, dark brown or blackish transverse bands, the first through eye and meeting that of the other side on interorbital space; the second from anterior part of spinous dorsal to base of pectorals; the third from posterior part of spinous and anterior part of soft dorsal to middle of base of anal; the fourth on caudal peduncle, immediately behind dorsal. These bands more or less reduced or even absent in adults. The first band may only be developed on interorbital space, the second and third reaching to lateral line, the fourth generally absent, but sometimes developed as a black blotch at base of caudal or on median caudal rays. Dorsal fin lighter or darker dusky, almost black where the bands of the body intrude on the fin. Sometimes the whole fin, excepting its posterior part, may be dark. A marginal dark, and a median light longitudinal band may be present. The posterior part of the soft dorsal with rows of white dots. Anal yellowish, with indistinct white dots. Caudal yellowish, with indistinct rows of white dots. Ventrals and pectorals yellowish hyaline. Length 95 mm.

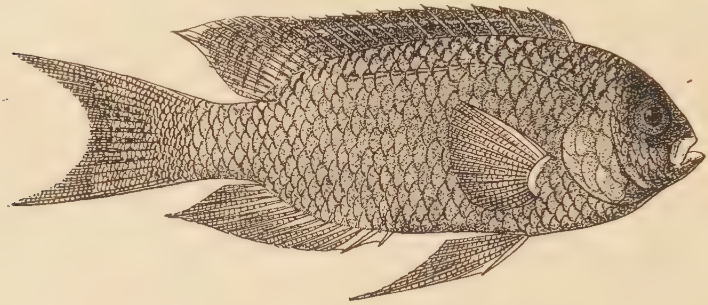

Fig. 47. *Pomacentrus breviceps* (Schl. & Müller), n.s.

Habitat: Singapore?; Sumatra (West Coast); Nias!; Bawean; Borneo (Sandakan); Sulu Islands; Celebes (Badjoa); Djampea!; Sumbawa; Timor; Halmahera; Ternate; Buru; Ceram; Ambon. — Philippines, New Caledonia.

Note. Von Martens (Exp. Ost-Asien, Zool. I, 1876, p. 396) records this species from Yokohama. This is probably a mistake. Fowler & Bean have separated specimens with a dark blotch at base of caudal as *beauforti*. Among my material I find two specimens from Nias, 74 and 84 mm long, with a similar blotch, but situated more backwards on the median caudal rays. I suppose that they merely represent colour variations, which may be constant in some populations and absent in others.

12. **Pomacentrus perspicillatus** C. V.

Pomacentrus perspicillatus Cuvier & Valenciennes, Hist. Nat. Poissons V, 1830, p. 417.

Pomacentrus trimaculatus Cuvier & Valenciennes, ibid. p. 427 (nec Rüppell).

Pomacentrus trimaculatus Schlegel & Müller, Verh. nat. gesch. Ned. overz. Bezitt. Zool. 1839—1841. Overzigt Amphiprion etc. p. 20. (nec Rüppell).

Pomacentrus trimaculatus Bleeker, Nat. Tijdschr. Ned. Indië IV, 1853, p. 481. (nec Rüpp.).

Pomacentrus trimaculatus Günther, Cat. Brit. Mus. IV, 1862, p. 19. (nec Rüpp.).

Pomacentrus trimaculatus Day, Fishes of India, Part III, 1877, p. 382. (nec Rüpp.).

Dischistodus trimaculatus Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 79. — Atl. Ichth. IX, 1877, Tab. 404, fig. 5. (nec Rüpp.).

Pomacentrus trimaculatus Günther, Fische der Südsee II, 1881, p. 227. (nec Rüpp.).

Pomacentrus trimaculatus Jordan & Seale, Bull. Bur. Fish. XXV (1905) 1906, p. 280. (nec Rüpp).

Pomacentrus trimaculatus Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 64. (nec Rüpp).

Pomacentrus perspicillatus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 101.

Pomacentrus perspicillatus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 312.

D. XIII. 14. A. II. 14. P. 2. 15. V. I. 5. Ll. 18 + 8. Ltr. $\begin{array}{c}2-2\frac{1}{2}\\ \hline 1\\ \hline 9\end{array}$. Sq. l. 28.

Height 2.2, 3 in length with caudal. Head 3.2, 4.3 in length with caudal. Length of head 1.1 in its height. Eye 3.6—3.7, 1.1 in snout and equal to almost flat interorbital space. Mouth slightly oblique. Maxillary reaching to a vertical about midway between nostril and anterior border of eye. Teeth conical, in two rows, those of the inner row shorter and more slender than those of the outer row. Preorbital and suborbital scaleless, of the same depth where the two bones join. Lower border of suborbital denticulated. Preopercle with 3 transverse rows of scales, the inferior limb and the inferior part of the posterior limb scaly. Hindborder of preopercle rather coarsely denticulated. Scales on upper part of head reaching to a line connecting frontborders of eyes. Dorsal spines slightly increasing in size posteriorly, the last somewhat longer than eye. Soft dorsal rather pointed, the median longest rays equal to snout and eye together. First anal spine less than half length of second, which is equal to postorbital part of head. Soft anal pointed, the post median rays longest, equal to snout and eye together. Ventrals pointed, nearly as long as head. Pectorals slightly shorter. Caudal forked, the lobes somewhat pointed. Colour of preserved specimen salmon coloured, belly and throat silvery. Head dark brown above, but interorbital space lighter and bordered anteriorly by narrow light bluish lines connecting eyes. A dark brown nuchal spot. Base of spinous dorsal dark brown between the 6th to 9th spines, this colour spreading downwards on back as a triangular blotch reaching to lateral line. A similar but more rounded spot at base of posterior part of soft anal and on the back below it. Surroundings of anus dark brown. A light bluish longitudinal streak below eye along middle of suborbital. Most scales of sides of head each with a bluish white spot. Similar spots above anus and above anterior part of anal. Scales of body with an indistinct light vertical streak. Fins light yellowish. Anal and caudal with a dusky margin. A small dark spot on superior part of pectoral axil. Length 200 mm.

Nom. indig. Laheta (Port Moresby).

Habitat: Singapore; Sumatra (Siboga); Simalur!; Batu Islands; Nias; Java (Batavia); Duizend Islands; Celebes (Makassar); Sulu Islands; Halmahera; Gomomo Island; Buru; Ceram; Ambon; Schouten Islands; New Guinea (Rubi, Port Moresby). — Andamans, China, Philippines, Pelew Islands, Guam, Marcus Islands. In sea.

13. **Pomacentrus prosopotaenia** Bleeker

Pomacentrus prosopotaenia Bleeker, Nat. Tijdschr. Ned. Indië III, 1852, p. 67.

Pomacentrus prosopotaenia Günther, Cat. Brit. Mus. IV, 1862, p. 23.

?*Pomacentrus interorbitalis* Günther, ibid. p. 30.

Pomacentrus perspicillatus Kner, Novara Exp. Fische I, 1865, p. 241 (nec C. V.).

Pomacentrus albofasciatus Day, Fishes of India, Part III, 1877, p. 384.

Dischistodus prosopotaenia Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 80. — Atl. Ichth. IX, 1877, Tab. 407, fig. 8.

Pomacentrus prosopotaenia Day, Fishes of India, Suppl. 1888, p. 801.

Pomacentrus prosopotaenia Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 63.

Pomacentrus prosopotaenia Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 104.

Dischistodus prosopotaenia Whitley, Mem. Queensl. Mus. IX, Part III, 1929, p. 236.

D. XIII. 14—15. A. II. 14—15. P. 2. 15. V. I. 5. Ll. 17 + 8—9. Ltr. $\begin{array}{c}2-2\frac{1}{2}\\ \hline 1\\ \hline 10\end{array}$. Sq. l. 26—27.

Height 2.2—2.3, 2.9—3 in length with caudal. Head 3.2—3.3, 4.1—4.3 in length with caudal. Length of head 1.1—1.2 in its height. Eye 3.7—4, 1.2—1.4 in snout and 1.1—1.2 in scarceley convex interorbital space. Mouth somewhat oblique. Maxillary reaching slightly beyond vertical through nostril. Teeth conical or somewhat truncate, in two series, those of the inner row more slender. Preorbital and suborbital without scales. Posterior part of preorbital and anterior part of suborbital of the same depth, the suborbital rapidly decreasing in depth posteriorly, its lower border, which is strongly denticulated, therefore oblique. Three transverse rows of scales on preopercle; the inferior and posterior limbs with smaller deciduous scales. Posterior border of preopercle with numerous pointed denticulations. Scales on upper part of head reaching to a line connecting frontborders of eyes. Dorsal spines increasing in size posteriorly, the last spine equal to snout and eye or somewhat shorter. The membranes between the spines slightly incised. Soft dorsal rather pointed, the longest rays equal to or somewhat more than head without snout. First anal spine less than half length of second, which is equal to postorbital part of head. Soft anal similar to soft dorsal. Pectorals and ventrals subequal, about half length of snout shorter than head. Caudal forked, the lobes rounded. Colour of preserved specimens yellowish or brownish. Most scales of head and belly with a white spot, elongated into longitudinal stripes on the scales of the sides, back, and tail. A narrow white band connecting frontborders of eyes. A similar band from eye to middle of upper lip, where the bands of both sides are connected by a similar band along upper lip. Another band below eye over suborbital, crossing corner of mouth to chin, interrupted or broken into short stripes in its lower course, the bands of both sides not meeting. Two parallel bands on chin behind this band, broken into short stripes or rows of spots. A small dark blotch at origin of lateral line. Interorbital space or snout darker than rest of upper part of head. An indistinct darker transverse band below spinous and another below soft dorsal. Axil of pectoral deep black, bordered by a white line superiorly; this ocellus covered by the base of the fin, except superiorly. Fins hyaline dusky or yellowish, anal with a broad greyish terminal and a narrow white subterminal band. Anus black. Length 193 mm.

Habitat: Singapore; Sumatra (Padang!); Nias; Java (Batavia!); Bawean; Celebes (Makassar!); Sulu Islands; Halmahera; Batjan; Buru; Ceram; Ambon; Flores!; Timor; New Guinea (Port Moresby). — Andamans, Nicobars, Annam, Philippines, Queensland. In sea.

14. **Pomacentrus fasciatus** C.V.

Pomacentrus fasciatus Cuvier & Valenciennes, Hist. Nat. Poissons V, 1830, p. 426.

Pomacentrus fasciatus Schlegel & Müller, Verh. nat. gesch. Ned. overz. Bezitt. Zool. 1839—1841. Overzigt Amphiprion etc. p. 20.
Pomacentrus fasciatus Bleeker, Nat. Tijdschr. Ned. Indië IV, 1853, p. 482.
Pomacentrus fasciatus Günther, Cat. Brit. Mus. IV, 1862, p. 19.
Pomacentrus fasciatus Steindachner, Sitzber. Akad. Wien LX, 1869, p. 565.
Dischistodus fasciatus Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N^{0} 6, 1877, p. 86. — Atl. Ichth. IX, 1877, Tab. 401, fig. 8.
Pomacentrus fasciatus Klunzinger, Sitzber. Akad. Wien LXXX, 1880, p. 397.
Pomacentrus fasciatus Jordan & Richardson, Bull. Bur. Fish. XXVII (1907) 1908, p. 263.
Pomacentrus fasciatus M. Weber, Siboga Exp. Fische 1913, p. 341.
Pomacentrus fasciatus Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 67.
Pomacentrus fasciatus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 111.
Pomacentrus fasciatus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 315.
Dischistodus fasciatus Whitley, Mem. Queensl. Mus. IX, Part III, 1929, p. 222, p. 236.

D. XIII. 13—14. A. II. 13. P. 2.15. V. I. 5. Ll. 17—18 + 7—10.

Ltr. $\begin{array}{c}2-2\frac{1}{2}\\ \hline 1\\ \hline 10\end{array}$. Sq. l. 27—28.

Height 2.2—2.3, 2.7—3 in length with caudal. Head 3—3.3, 4—4.3 in length with caudal. Length of head 1.1 in its height. Eye 4—4.4, 1.2—1.5 in snout and 1.2—1.3 in convex interorbital space. In a small specimen of 58 mm the eye is 2.9, and about equal to snout and to interorbital space. Mouth oblique. Maxillary reaching to below nostril in adults. Teeth with rounded tips, in 2 rows. Preorbital and suborbital without scales. The depth of the posterior part of the preorbital is equal to that of the anterior part of the suborbital. Lower border of suborbital feebly denticulated. Three transverse rows of scales on preopercle, the posterior and a very broad inferior limb naked. Hindborder of preopercle with rather blunt but distinct denticulations. Scales on upper part of head reaching to a line connecting middle of eyes. Dorsal spines increasing in height posteriorly, the last one equal to snout and half diameter of eye together. Membranes between the spines not or scarcely incised. Soft dorsal rather pointed, the median rays longest and equal to head without snout. First anal spine slightly less than half length of second, which is equal to postorbital part of head. Soft anal rounded, the post median rays longest, equal to snout and eye together. Pectorals and ventrals subequal, somewhat more than head without snout. Caudal emarginate or slightly forked, the lobes rounded. Colour of preserved specimens: Upper part of head, and of body and tail dark brown, lower half of sides and belly light brown or whitish. Four whitish transverse bands, first from nape to operculum, second from basal part of dorsal, between second to fourth spines to middle of sides. Third from base of dorsal between 11th to 13th spines to one or two scales below lateral line; fourth on caudal peduncle immediately behind dorsal. Many scales of body and tail with a more or less distinct bluish white longitudinal stripe. A black spot at origin of lateral line. Some scales between lateral line and pectoral with large black spots, variously developed, sometimes forming a single or double longitudinal row, sometimes only present on a few scales. A bluish white band from eye to middle of upper jaw. Another along suborbital. Scales of preopercle and opercle each with a bluish white spot. These markings on head not always distinct. Spinous dorsal colour of the back, but white where the white bands of the body intrude on the fin, and also with a light subterminal and a dark terminal longitudinal band. Soft dorsal light, but brown anteriorly behind the third band and often the colour is so dark as to form an almost black patch on this part of the fin. Anal lighter or darker brown, with a more or less distinct dusky median longitudinal band. Caudal varying between yellowish and dark brown. Pectorals and ventrals dusky or light brownish, ventrals sometimes somewhat darker. Length 117 mm.

Habitat: Singapore; Sumatra (Telok Betong); Biliton; Java (Batavia!); Madura!; Borneo (Sandakan); Bawean; Kangean Islands!; Celebes (Makassar!, Gorontalo); Sulu Islands!; Sumbawa; Rotti!; Timor; Halmahera; Buru; Ceram; Ambon; Island Babi; Island Endu; Banda!; Aru Islands!; Waigeu! — Philippines, North Australia. In sea.

15. **Pomacentrus chrysopoecilus** Schl. & Müller

Pomacentrus chrysopoecilus Schlegel & Müller, Verh. nat. gesch. Ned. overz. Bezitt. Zoologie. 1839—1841. Overzigt Amphiprion etc. p. 21.

Pomacentrus notostigmus Richardson, Voyage Sulphur. Zool. Fish. 1844, p. 89.

Pomacentrus chrysopoecilus Bleeker, Nat. Tijdschr. Ned. Indië III, 1852, p. 284.

Pomacentrus chrysopoecilus Günther, Cat. Brit. Mus. IV, 1862, p. 20.

Pomacentrus chrysopoecilus Steindachner, Sitzber. Akad. Wien LX, 1869, p. 566. — Abh. Senckenb. naturf. Ges. XXV, 1901, p. 440.

Dischistodus chrysopoecilus Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 84. — Atl. Ichth. IX, 1877, Tab. 406, fig. 9.

Pomacentrus fasciatus var. *intermedia* M. Weber, Siboga Exp. Fische 1913, p. 340.

Pomacentrus chrysopoecilus Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 61.
Pomacentrus pristiger Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 109 (nec C. V).

D. XIII. 15 1). A. II. 13. P. 2. 15. V. I. 5. Ll. 16—19 + 8—10. Ltr. $\begin{array}{c}2-2\frac{1}{2}\\ \hline 1\\ \hline 9\end{array}$. Sq. l. 26—28.

Height 2.2—2.3, 2.8—3 in length with caudal. Head 3.1—3.5, 4—4.4 in length with caudal. Length of head 1.1 in its height. Eye 3.7—4.3, 1.2—1.5 in snout and 1.1—1.4 in slightly convex interorbital space. Mouth somewhat oblique. Maxillary reaching to below nostril. Teeth conical, in 2 rows, the inner row consisting of more slender teeth. Preorbital and suborbital without scales, their lower border strongly denticulated. Depth of posterior part of preorbital more than that of anterior part of suborbital, hence a notch between the two bones. Three transverse rows of scales on preopercle, the inferior limb scaly, the posterior limb narrowly naked. Posterior border of preopercle coarsely denticulated. Scales on upper part of head reaching to a line connecting frontborders of eyes. Dorsal spines increasing in length posteriorly, the last one equal to snout and half diameter of eye together. Soft dorsal pointed, the longest ray equal to head without snout. First anal spine less than second, which is strong but short and as long as postorbital part of head. Lower border of anal somewhat rounded, the post median rays longest and equal to head without snout. Ventrals with the first ray somewhat produced, almost as long as head. Pectorals somewhat shorter. Caudal forked, the lobes rounded. Colour of preserved specimens brownish, the scales of body and tail with longitudinal bluish white stripes. A white or yellowish blotch between the dorsal and the lateral line, about below 6th to 8th spines. A black spot or a silvery grey spot edged with black at origin of lateral line. A narrow white band below eye, running along suborbital and preorbital to middle of upper jaw. Traces of a rather broad greyish nuchal band, connecting the dark spots at the base of lateral line from both sides. A generally indistinct narrow white band connecting frontborders of eyes. Fins brown, anal and ventrals darker, almost black. In a young specimen the scales of the opercle have each a large dark blotch. In another young specimen the dorsal is dark basally, followed on the posterior

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1) In one specimen I find D. XII. 15 but as the first ray is not forked this is certainly an abnormality.

part of the dorsal by an oblique greyish band. Base of caudal also dark in this specimen, followed by a transverse greyish band. Length 148 mm.

Habitat: Singapore; Sumatra (West Coast); Biliton; Java (Batavia!); Duizend Islands!; Bawean; Celebes (Makassar, Menado); Sulu Islands!; Batjan; Buru; Ceram; Ambon; Goram; Gébe. — Philippines, Pelew Islands. In sea.

Note. M. Weber has recorded specimens intermediate between this species and *fasciatus* as var. *intermedia.* They differ from typical *chrysopoecilus* in that the scales on the upper part of the head do not reach the line connecting frontborders of eyes; they reach however somewhat further than in *fasciatus,* where they reach a line connecting middle of eyes. There is a slight notch between preorbital and suborbital and the white blotch below the dorsal is developed as a white band, tapering downwards to middle of sides. This is the case in the specimen figured by Weber but in the two other specimens mentioned the blotch is normal. Although it may be possible, that they are hybrids between *chrysopoecilus* and *fasciatus,* as suggested by Weber, they show more resemblance to the former than to the latter species, and may fall inside the limits of variation of *chrysopoecilus.*

Fowler & Bean have used the name *pristiger* C. V. for this species. *P. pristiger* however as described by Cuvier & Valenciennes and redescribed and figured by Sauvage (Poissons de Madagascar, 1891, p. 425, plate 46, fig. 4) is a totally different species, with twelve dorsal spines and the preorbital and suborbital scaly. This species from Mauritius is probably near *P. nigricans* but has nothing to do with *chrysopoecilus.*

16. **Pomacentrus notophthalmus** Blkr.

Pomacentrus notophthalmus Bleeker, Nat. Tijdschr. Ned. Indië IV, 1853, p. 137.

Pomacentrus melanotus Bleeker, Acta Soc. Sc. Indo-Neerl. III, 1858. Tiende bijdr. vischf. Celebes, p. 13.

Pomacentrus notophthalmus Günther, Cat. Brit. Mus. IV, 1862, p. 20.

Dischistodus notophthalmus Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 82. — Atl. Ichth. IX, 1877, Tab. 401, fig. 4.

Pomacentrus notophthalmus Jordan & Seale, Bull. Bur. Fish. XXV (1905) 1906, p. 280.

Pomacentrus suluensis Seale, Philipp. Journ. Sc. IV, N⁰ 6, 1909, p. 519.

Pomacentrus notophthalmus Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 62.

Pomacentrus notophthalmus Fowler & Bean, Bull. U. S. Nat. Mus. 100 Vol. VII, 1928, p. 107.

Pomacentrus notophthalmus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 312.
Pomacentrus notophthalmus Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 287.

D. XIII. 13. A. II. 13. P. 2. 15. V. I. 5. Ll. 18 + 6. Ltr. $\begin{array}{c}2-2\frac{1}{2}\\\hline 1\\\hline 9\end{array}$. Sq. l. 27.

Height 2.2, 2.8 in length with caudal. Head 3.4, 4.4 in length with caudal. Length of head equal to its height. Eye 3.7, 1.1 in snout and 1.1 in scarcely convex interorbital space. Mouth somewhat oblique. Maxillary reaching to below nostril. Teeth conical, in two series. Preorbital and suborbital scaleless, the latter strongly denticulated. Three transverse rows of scales on preopercle, the inferior limb scaly, the posterior limb narrowly naked. Posterior border of preopercle with crowded pointed denticulations. Scales on upper part of head reaching beyond nostrils. Dorsal spines increasing in size posteriorly, the last one equal to snout and eye together. Membranes between the dorsal spines scarcely incised. Soft dorsal pointed, the longest ray equal to head without snout. Anal rounded, the post median rays longest, half length of snout shorter than head. Pectorals half length of snout shorter than head. Ventrals with the first ray produced, equal to head. Caudal forked, the lobes rounded. Colour of preserved specimens yellowish. Upper part of head and anterior part of back to about below the 11th dorsal spine dark brown. The membranes between the 1st to 11th dorsal spines also dark, with a white subterminal and a black terminal edge. A dark brown blotch at base of 9th to 11th spines, in young ones surrounded by white line and forming an ocellus. Anal region dark brown, the colour continued on spines and first ray of anal. A chalky white band from lower frontborder of eye to middle of upper jaw. A similar band below eye on suborbital. Below this band another longitudinal one over superior row of scales on preopercle to corner of mouth. Scales of opercle and those above pectoral each with a large white spot. A small dark blotch at origin of lateral line. Fins yellowish. Very young specimens have two broad light transverse bands on the body. Length 154 mm.

Habitat: Singapore; Celebes (Menado); Sangi Islands; Sulu Islands; Ternate; Buru; Nusa Laut!; Goram; New Guinea (South Coast!). — Ceylon?, Philippines, New Britain, Solomon Islands, New Hebrides, Woodlark Island, Samoa. In sea, on reefs, and in tidal waters.

Note. This species has been recorded from Ceylon by Karoli (Termeszetrajzi Füzetek V, 1882, p. 27) but as the localities mentioned by this author are often erroneous and as I know of no other records from India I doubt the correctness of his statement.

17. **Pomacentrus stigma** Fowler & Bean

Pomacentrus stigma Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 100.
Pseudopomacentrus stigma Roxas & Martin, Bur. Sc. Manila. Techn. Bull. 6, 1937, p. 194.

D. XIV. 12—14. A. II. 14. Ll. 14—16 + 8—9. Ltr. $\begin{array}{c}4\\\hline 1\\\hline 6\end{array}$.

Depth $1^{4}/_{5}$ to $1^{7}/_{8}$; head $3^{1}/_{4}$ to $3^{2}/_{3}$. Snout $3^{1}/_{2}$ to $4^{1}/_{8}$. Eye 3—$3^{1}/_{4}$. Maxillary very oblique, extends little beyond front of eye, to pupil in young. Teeth uniserial, conic, ends pointed. Interorbital $2^{4}/_{5}$ to $3^{1}/_{8}$, convex. Suborbital with small denticle below, otherwise entire. Hind opercle edge denticulate. Scales on head not quite reaching to upper lip. Fourteenth dorsal spine $1^{3}/_{4}$ to $1^{2}/_{3}$ in head, sixth ray $1^{1}/_{6}$ to $1^{1}/_{3}$. Second anal spine $1^{3}/_{4}$ to 2, equal to postorbital part of head. Caudal deeply emarginate. Back and upper surface brown, sides paler and under surface whitish. Small dusky or blackish spot at pectoral origin, much less than pupil diameter. Dorsal with dark brown terminally, pale basally. Caudal dull or pale brown. Anal with last 5 or 6 rays included in contrasted black area, rest of fin whitish, becoming little grey terminally. Paired fins pale brown. Length 114 mm. (After Fowler & Bean, not seen by me).

Habitat: Sulu Islands. — Philippines. In sea.

18. **Pomacentrus melanochir** Blkr.

Pomacentrus melanochir Bleeker, Versl. Akad. Amsterdam (2) X, 1877, p. 396. — Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 49. — Atl. Ichth. IX, 1877, Tab. 408, fig. 4.

D. XIII. 12—14. A. II. 13—14. P. 2. 15—16. V. I. 5. Sq. l. 28. Ltr. $\begin{array}{c}3—3\frac{1}{2}\\\hline 1\\\hline 9—10\end{array}$.

Height 2.2—2.5, 3.2—3.3 in length with caudal. Head 4.3—4.7. Eye 2.5—3. Scales on upper part of head reaching to between nostrils. Preorbital with a feeble notch. Suborbital without scales. Mouth oblique. Teeth in two rows. Preopercle slightly denticulated in adults, scarcely so in young ones. Three transverse rows of scales on preopercle and one on inferior limb. Posterior limb naked. Dorsal spines gradually increasing in size posteriorly. Soft dorsal pointed, much higher than spinous part. Soft anal similar to soft dorsal. Pectorals equal to head or somewhat shorter. Ventrals with the first ray produced, longer than head. Caudal forked, the lobes pointed. Violaceus brown, lighter below. Head with an orange tint. Scales of head and body with transverse margaritaceous spots. A large dark blotch at base of pectoral. Other fins dusky. Length 74 mm (After Bleeker, not seen by me).

Habitat: Bali; Flores; Timor; North Celebes; Buru; Ambon; Mysore. In sea.

Note. This species forms a transition between *Pomacentrus* and *Abudefduf*. Besides Bleeker it has only been recorded by A. B. Meyer (Anal. Soc. Esp. Hist. Nat. XIV, 1885, p. 34). The species described by Sauvage (Poissons de Madagascar, 1891, p. 428) as *P. melanochir* is a quite different species with only twelve dorsal spines.

19. **Pomacentrus melanopterus** Blkr.

Pomacentrus brachialis Cuvier & Valenciennes, Hist. Nat. Poissons V, 1830, p. 420 (partim).

Pomacentrus melanopterus Bleeker, Nat. Tijdschr. Ned. Indië III, 1852, p. 562.

Pomacentrus melanopterus Günther, Cat. Brit. Mus. IV, 1862, p. 24.

Pomacentrus (*Pseudopomacentrus*) *melanopterus* Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 55. — Atl. Ichth. IX, 1877, Tab. 402, fig. 6.

Pomacentrus melanopterus Jordan & Seale, Bull. Bur. Fish. XXV (1905) 1906, p. 281.

Pomacentrus violascens Fowler, Proc. Acad. Nat. Sc. Philadelphia LXX, 1918, p. 43 (nec Blkr).

Pomacentrus melanopterus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 80 (partim).

Pomacentrus melanopterus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 311 (sine syn.).

Pomacentrus melanopterus Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 289.

D. XIII. 14. A. II. 15. P. 2. 15. V. I. 5. Ll. 19 + 8. Ltr. $\begin{array}{c}2\\\hline 1\\\hline 10\end{array}$. Sq. l. 26—27.

Height 2.1, 2.7 in length with caudal. Head 3.3, 4 in length with caudal. Length of head 1.1. in its height. Eye 3.1, equal to snout and to somewhat convex interorbital space. Mouth oblique. Maxillary reaching to vertical midway between nostril and frontborder of eye. Teeth rounded at their tip, in 2 rows, the inner row consisting of shorter and more slender teeth. Preorbital naked, ending posteriorly in a flat spine. Suborbital much lower, naked, with poorly developed denticulations along its lower border. Scales on preopercle posteriorly in two, anteriorly in three transverse series, besides one row on inferior limb. Posterior limb also scaly. Hindborder of preopercle with small, rather pointed denticulations. Scales on upper part of head reaching to between nostrils. Dorsal spines slightly increasing in length posteriorly, the last equal to snout and half diameter of eye together. Soft dorsal pointed, the longest rays equal to head without snout. First anal spine less than length of second, which is about as long as last dorsal spine, but much stronger. Soft anal similar to soft dorsal. Ventrals with the first ray produced, as long as head. Pectorals slightly shorter. Caudal slightly forked. Colour of preserved specimens brownish olive. A black band along base of pectoral. A dark patch at origin of lateral line may be present. Fins lighter or darker brown, anal darker. Membranes between the dorsal spines with a dark edge. Posterior ventral rays more or less blackish. Length 103 mm.

Habitat: Singapore; Java; Duizend Islands!; Bawean; Bali; Flores; Celebes (Labuandata Bay, Limbe Strait, Cape Kait); Dodepo and Pasejogo Islands; Buru; Ambon!; Ceram; Halmahera; Maitara; Tidore; Makian; Banda; New Guinea (Manokwari). — Riu Kiu Islands, Formosa, Philippines, Solomon Islands, Samoa. In sea, entering rivers.

Note. Sauvage (Poissons de Madagascar, 1891, p. 427) has united this species with *Pomacentrus megalops* Liénard (Rep. Soc. Hist. Nat. Maurice X, 1839, p. 34) but the description by Liénard is so short and unsufficient, that there is no reason to adopt this synonymy.

20. **Pomacentrus nigromanus** M. Weber (Fig. 48, p. 382)

?*Pomacentrus analis* Macleay, Proc. Linn. Soc. New S. Wales VII, 1883, p. 364.
Pomacentrus nigromanus M. Weber, Siboga Exp. Fische 1913, p. 338.
Pomacentrus melanopterus Fowler & Bean, Bull U. S. Nat. Mus. 100. Vol. VII, 1928, p. 80 (partim).

D. XIII. 14. A. II. 14. P. 2. 14. V. I. 5. Ll. 16 + 11. Ltr. $\begin{array}{c}2-2\frac{1}{2}\\ \hline 1\\ \hline 10\end{array}$. Sq. l. 26.

Height 1.9, 2.4 in length with caudal. Head 3.4, 4.2 in length with caudal. Length of head 1.2 in its height. Eye 3.6, equal to snout and 1.1 in convex interorbital space. Mouth very oblique. Maxillary reaching beyond vertical through nostril but not quite below front-border of eye. Teeth conical, in two rows, the inner row consisting of shorter and more slender teeth. Preorbital and suborbital without scales, the former ending in a spine and separated by a notch from the suborbital, the lower border of which is poorly denticulated. Three transverse rows of scales on preopercle, the inferior and posterior limbs scaly. Hindborder of preopercle feebly denticulated. Scales on upper part of head reaching beyond nostrils. Dorsal spines increasing in length posteriorly, the last equal to snout and half diameter of eye. Membranes between the spines deeply incised and lobated. Soft dorsal pointed, the longest rays equal to head without snout. First anal spine less than half length of second, which is equal to eye and snout together and not much shorter than anal rays. Ventrals with the first ray produced, equal to pectorals and slightly more than head. Caudal slightly forked. Colour of preserved specimen brown, head and back darker, belly, sides, tail and fins lighter. Anal almost black to the 9th ray. Spinous dorsal with a dark edge. Anterior ventral rays dark. A large black blotch at base of pectoral. Length of type, redescribed here and now much faded, 80 mm.

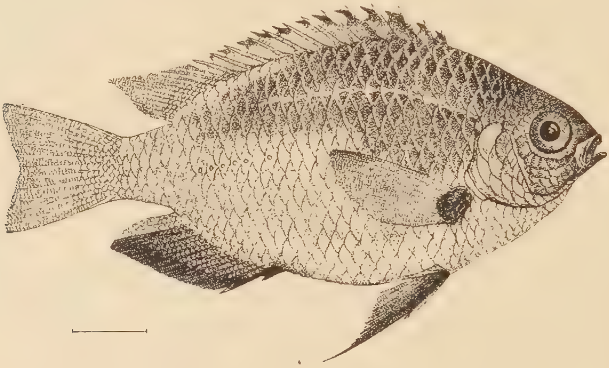

Fig. 48. *Pomacentrus nigromanus* M. Web. n.s.

Habitat: Ambon! Halmahera!; New Guinea? In sea, on reefs.

21. **Pomacentrus moluccensis** Blkr.

Pomacentrus moluccensis Bleeker, Nat. Tijdschr. Ned. Indië IV, 1853, p. 118.
Pomacentrus moluccensis Günther, Cat. Brit. Mus. IV, 1862, p. 30.

Pomacentrus (*Pseudopomacentrus*) *moluccensis* Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N° 6, 1877, p. 56. — Atl. Ichth. IX, 1877, Tab. 402, fig. 3.
Pomacentrus tropicus Seale, Philipp. Journ. Sc. 1909, p. 517.
Pomacentrus moluccensis M. Weber, Siboga Exp. Fische 1913, p. 337.
Pomacentrus moluccensis De Beaufort, Bijdr. Dierk. Afl. 19, 1913, p. 127.
Pomacentrus hebardi Fowler, Proc. Acad. Nat. Sc. Philadelphia LXX, 1918, p. 46.
Pomacentrus tropicus Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 49.
Pomacentrus moluccensis Montalban, ibid. p. 50.
Pomacentrus tropicus Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 282.
Pomacentrus moluccensis Herre, ibid. p. 283.

D. XIII. 13—14. A. II. 14. P. 2. 15. V. I. 5. Ll. 17 + 8. Ltr. $\begin{array}{c}2\\ \hline 1\\ \hline 9\end{array}$. Sq. l. 27—28.

Height 1.9, 2.4 in length with caudal. Head 3—3.1, 3.7—3.9 in length with caudal. Length of head 1.2—1.3 in its height. Eye 3—3.1, somewhat more than snout and 1.1—1.2 in nearly flat interorbital space. Mouth oblique. Maxillary reaching to below frontborder of eye or nearly so. Teeth rounded at tip, in two series. Preorbital and suborbital naked. Preorbital ending posteriorly in a flat spine. Suborbital much narrower, with a few denticulations. Hindborder of preopercle with small, blunt, denticulations, those near its angle somewhat larger. Two or three transverse rows of scales on preopercle, besides a third row on inferior limb., Posterior limb scaly or very narrowly naked. Lower jaw scaly posteriorly. Scales on upper part of head reaching to before nostrils. Dorsal spines slightly increasing in size to about the sixth spine, which is subequal to the following and as long as postorbital part of head. Soft dorsal pointed, the longest rays equal to head without snout or somewhat longer. Scaly sheath of dorsal thick, pad like. First anal spine about half length of second, which is equal to but stronger than last dorsal spine. Soft anal similar to soft dorsal. Ventrals with the first ray produced, longer than head. Pectorals somewhat shorter. Caudal slightly forked, the lobes rounded. Colour of preserved specimens dark brown on upper part of head and back, lighter below. A small black spot, less than pupil, at origin of lateral line. A bluish white longitudinal line, not always distinct, beginning above base of ventrals, running backwards to base of second anal spine and often continued as a subterminal band on anal, which generally has a dark brown edge. Traces of bluish white stripes may be present on preorbital and preopercle. These stripes are more distinct in young specimens. Fins light yellowish, the incised edge of the membranes between the dorsal spines dark. Length 78 mm.

Habitat: Singapore; Batu Islands; Java (Malang); Bawean; Kabala dua, Borneo Bank!; Celebes (Menado, Kwandang!); Sulu Islands; Flores; Lamakera!; Solor; Timor; Ternate; Buru; Ceram; Ambon!; Goram; New Guinea (Manokwari). — Philippines, Solomon Islands, New Hebrides. In sea.

Note. Fowler & Bean have united this species with *littoralis*. Last named species however differs in having a scaly patch on the preorbital. As has already been pointed out by Weber l.c. this species is characterized by a bluish white line running along belly to and on anal. Bleeker does not describe it, but on the plate in the Atlas the anal is figured with the band just mentioned. Günther was the first to mention it. It is not always distinct, more so in young specimens, which have also stripes of the same colour on the head.

22. **Pomacentrus reidi** Fowler & Bean

Pomacentrus reidi Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 99.

Pseudopomacentrus reidi Roxas & Martin, Bur. Sc. Manila, Techn. Bull. 6, 1937, p. 194.

D. XIII—XIV. 13—15. A. II. 13—14. Ll. 16—17 + 4—5. Ltr. $\frac{4}{\frac{1}{6}}$.

Depth $1^5/_6$ to 2; head $3^1/_3$ to $3^1/_2$. Snout $3^7/_8$ to 4; eye $2^7/_8$ to $3^2/_3$, 1 to $1^1/_8$ in interorbital. Maxillary reaches eye. Teeth uniserial, compressed moderately, and tips rounded. Interorbital convex. Suborbital edge entire, with small spine on lower preorbital edge. Hind preopercle edge denticulate. Two rows of scales on cheek and one on inferior preopercular limb. Scales on head extending to nostril or slightly forward. Fourth dorsal spine $2^1/_8$ or $2^1/_5$ in head, sixth ray $1^1/_3$ to $1^1/_2$. Caudal emarginate. Brown, nearly uniform or but little paler below. Young with grey line along suborbital. Dorsal and anal deep brown. Caudal usually pale, sometimes light grey or sometimes all rayed vertical fins pale brown. Dark to dusky brown small spot, much less than pupil, at pectoral origin, little invading axil of fin. Paired fins pale brown. Length 121 mm. (After Fowler & Bean, not seen by me).

Habitat: Celebes (Labuandata Bay and Basa Reef in Gulf of Boni); Buru; Makian. — Philippines. In sea.

23. **Pomacentrus pavo** (Bl.)

Chaetodon pavo Bloch, Naturgesch. Ausländ. Fische III, 1787, p. 60.
Pomacentrus pavo Lacepède, Hist. Nat. Poissons IV, 1802, p. 505, p. 508.
Pomacentrus caeruleus Quoy & Gaimard, Voyage Uranie & Physicienne, Zool. 1824, p. 397.
Pomacentrus pavo Rüppell, Atlas Reise N. Afrika. Fische. 1828, p. 37.
Pomacentrus pavo Cuvier & Valenciennes, Hist. Nat. Poissons V, 1830, p. 413.
Pomacentrus pavo Schlegel & Müller, Ver. nat. gesch. Ned. overz. Bezitt. Zool. 1839—1841. Overzigt Amphiprion etc. p. 20.
Pomacentrus pavo Bleeker, Nat. Tijdschr. Ned. Indië II, 1851, p. 47.
?*Pomacentrus polynema* Bleeker, ibid. IV, 1853, p. 283.
Pomacentrus pavoninus Bleeker, ibid. V, 1853, p. 85.
Pomacentrus pavo Günther, Cat. Brit. Mus. IV, 1862, p. 23.
Pomacentrus (*Pomacentrus*) *pavo* Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 42. — Atl. Ichth. IX, 1877, Tab. 408, fig. 9.
?*Parapomacentrus polynema* Bleeker, ibid. p. 65. — ibid. Tab. 408, fig. 1.
Pomacentrus pavo Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 523.
Pomacentrus pavo Günther, Fische der Südsee II, 1881, p. 227.
Pomacentrus caeruleus Sauvage, Poissons de Madagascar, 1891, p. 429.
Pomacentrus pavo Jordan & Seale, Bull. Bur. Fish. XXV (1905) 1906, p. 279.
Pomacentrus pavo Steindachner, Sitzber. Akad. Wien CXV, 1906, p. 1397.
Pomacentrus pavo M. Weber, Siboga Exp. Fische 1913, p. 336.
Pomacentrus melanochir De Beaufort, Bijdr. Dierk. Afl. 19. 1913, p. 127 (nec Blkr.).
Pomacentrus pavo Barnard, Ann. S. Afric. Mus. XXI, 1925—1927, p. 735.
Pomacentrus pavo Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 43.
Pomacentrus melanochir Montalban, ibid. p. 66 (nec Blkr.).
Pomacentrus pavo Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 68.
Pomacentrus caeruleus Fowler & Bean, ibid. p. 70.
Pomacentrus pavo Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 310.
Pomacentrus pavo Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 279.
Pomacentrus caeruleus Herre, ibid. p. 280.

D. XIII. 13—14. A. II. 13 (14). P. 2. 14—15. V. I. 5. Ll. 17—18 (+ 2—3) + 9. Ltr. $\begin{array}{c} 2-2\frac{1}{2} \\ \hline 1 \\ \hline 9 \end{array}$ Sq. l. 28.

Height 2.3—2.4, 3—3.2 in length with caudal. Head 3.1—3.5, 4.1—4.6 in length with caudal. Length of head 0.9—1.1 in its height. Eye 2.8—3.2, equal to slightly convex interorbital space. Snout short, 1.4—1.6 in eye. Mouth oblique. Maxillary reaching to below front-border of pupil. Teeth truncate, in 2 rows, those of the inner row more slender than those of the outer row; the two rows close together. Preorbital with a hooked, flat, spine. Suborbital with a few similar spines, and some smaller spines posteriorly. Dentitions of pre- and suborbital less developed in young. Posterior border of preopercle conspiciously denticulated. Preorbital and suborbital naked. Preopercle with two transverse rows of scales, and one row on inferior limb; the posterior limb naked. Upper part of head scaly to between nostrils. Dorsal spines increasing in size to the third which is equal to the following spines and as long as snout and eye together. Soft dorsal and anal pointed, their longest rays subequal and more than head without snout. First anal spine about one third that of second, which is almost equal to head without snout. Ventrals with the first ray produced into a short filament, as long as pectorals and equal to head. Caudal forked, the lobes pointed and slightly produced into filaments in adults. Colour of preserved specimens yellowish or brownish, lighter below, sometimes with a pinkish tinge. A bluish white narrow band from upper border of eye to snout, meeting there that of the other side. Another from middle of upper jaw to eye, bifurcating and surrounding anterior half of pupil, continued as two parallel bands on iris and as rows of spots behind eye. Scales of head each with a bluish white rounded or longitudinally elongate spot. Similar spots on body and tail, those of the sides forming transverse stripes over the scales. These spots on head, body, and tail often spreading on the whole scales or nearly so, in which case the fish is shiny bluish white, only pinkish on thorax and belly. Generally a dark violet spot superiorly on hindborder of opercle. Dorsal and anal yellowish or brownish, sometimes with a dark edge; the scales covering the basal half of the membranes between the spines and rays each with a bluish white spot. Anal often with indications of brown longitudinal bands. Caudal yellow or pinkish. Ventrals and pectorals yellowish hyaline. Often a dark spot at axil of pectoral. Length 112 mm.

Habitat: Sumatra (Siboga, Padang!, Priaman); Simalur!; Nias; Biliton; Java (Batavia, Malang); Bawean; Celebes (Menado, Tanawanko); Basa Reef, Gulf of Boni; Limbe Strait; Sangi Islands; Sulu Islands!; Saleyer!; Flores!; Solor; Damar!; Timor; Ternate; Makian; Obi major; Buru; Ceram; Ambon!; Haruko; Nusa Laut; Goram; Banda!; Tiur!; New Guinea (Manokwari). — Madagascar, Mozambique, Zanzibar, Red Sea, Mauritius, Philippines, Bonham Island, Ponapé, Solomon Islands, New Hebrides, Ellice Islands, Gilbert Islands, Samoa, Tahiti, Paumotu Islands, Marquesas Islands. In sea.

Note. *Pomacentrus polynema* Blkr. is based on a single specimen which only differs from *pavo* in having one in stead of two rows of teeth in the jaws. It has never been found again. I place it provisionally among the synonyms of *pavo*.

24. **Pomacentrus amboinensis** Blkr.

Pomacentrus amboinensis Bleeker, Versl. Akad. Amsterdam (2) II, 1868, p. 334.
Pomacentrus (*Pseudopomacentrus*) *amboinensis* Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 58. — Atl. Ichth. IX, 1877, Tab. 406, fig. 7.
Pomacentrus amboinensis M. Weber, Siboga Exp. Fische 1913, p. 339.
Pomacentrus amboinensis Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 58.
Pomacentrus amboinensis Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 86.
Pomacentrus amboinensis Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 314.
Pseudopomacentrus amboinensis Whitley, Mem. Queensl. Mus. IX, Part III, 1929, p. 237.
Pomacentrus amboinensis Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 285.

D. XIII. 14—16. A. II. 15—16. P. 2. 15. V. I. 5. Ll. 17 + 8. Ltr. $\begin{array}{c} 1\frac{1}{2}-2 \\ \hline 1 \\ \hline 9 \end{array}$. Sq. l. 28.

Height 2.1—2.3, 2.6—2.8 in length with caudal. Head 3—3.4, 4—4.2 in length with caudal. Length of head 1.1—1.2 in its height. Eye 3.3—4.2, equal to or somewhat more than snout and 1.2 in convex interorbital space. Mouth oblique. Maxillary reaching to vertical midway between nostril and frontborder of eye. Teeth rounded at tip, in two rows, the inner row consisting of more slender teeth. Preorbital and suborbital naked. Preorbital ending posteriorly in a strong flat spine. Suborbital much narrower, strongly serrated. Hindborder of preopercle coarsely serrated. Two transverse rows of scales on preopercle, besides one row on inferior limb. Posterior limb naked. Lower jaw scaly posteriorly. Scales on upper part of head reaching to between nostrils. Dorsal spines increasing in length to the fifth or sixth, which are subequal or only slightly shorter than the following. Last spine equal to snout and eye together. Soft dorsal pointed, the longest ray about equal to head. First anal spine half length of second, which is equal to longest dorsal spine. Soft anal similar to soft dorsal. Pectorals about equal to head, ventrals with the first ray produced considerably longer. Caudal slightly forked. Colour of preserved specimens brown, lighter below. Posterior part of body, scaly sheath of dorsal, and tail with numerous small bluish white spots. Similar spots, forming longitudinal rows, from base of anal to above base of ventrals. Two bluish white stripes from eye to upper jaw, below and parallel to these a stripe from hindborder of preopercle to corner of mouth, more or less broken into spots. Most scales of opercular bones with similar spots, more or less arranged in rows. Some spots of the same colour at base of pectoral, which has a rather large deep black blotch superiorly at its base. A small bluish black spot at origin of lateral line. Fins yellowish. Spinous dorsal sometimes with a light submarginal and a darker terminal longitudinal band. A black, white edged ocellus in posterior part of soft dorsal may be present. Anal with two longitudinal white narrow bands, the upper one more or less a continuation of the rows of spots on belly. Length 108 mm.

Habitat: Singapore; Celebes (Sadaa, Basa Reef in Gulf of Boni, Limbe Strait); Makian; Tidore; Ternate; Halmahera; Doworra Island; Gomomo Island; Ambon!; Banda!; New Guinea (Port Moresby). — Philippines, Pelew Islands, Solomon Islands, New Hebrides, Coast of Queensland. In sea.

25. **Pomacentrus tripunctatus** C. V.

Pomacentrus tripunctatus Cuvier & Valenciennes, Hist. Nat. Poissons V, 1830, p. 421.
Pomacentrus vanicolensis Cuvier & Valenciennes, l.c.
Pomacentrus emarginatus Cuvier & Valenciennes, ibid. p. 422.
Pomacentrus trilineatus Cuvier & Valenciennes, ibid. p. 428.
Pomacentrus emarginatus Lesson, Voyage Coquille. Zool. II. 1e Partie. 1830, p. 189.
Pomacentrus biocellatus Rüppell, Neue Wirbelthiere. Fische. 1835, p. 127.
Pomacentrus marginatus Schlegel & Müller, Verh. nat. gesch. Ned. overz. Bezitt. Zool. 1839—1841. Overzigt Amphiprion etc. p. 20.
Pristotis fuscus Bleeker, Verh. Bat. Gen. XXII, 1849. Bijdr. ichth. Bali, p. 9.
Pomacentrus kalunko Bleeker, Nat. Tijdschr. Ned. Indië III, 1852, p. 169.
Pomacentrus taeniometopon Bleeker, ibid. p. 283.
Pomacentrus emarginatus Bleeker, ibid. p. 284.
Pomacentrus taeniops Bleeker, ibid. p. 729 (nec C. V.).
Pomacentrus bankanensis Bleeker, ibid. V, 1853, p. 513.
Pomacentrus simsiang Bleeker, ibid. XI, 1856, p. 90.
Pomacentrus dorsalis Gill, Proc. Acad. Nat. Sc. Philadelphia (1859) 1860. p. 147.
Pomacentrus trilineatus Günther, Cat. Brit. Mus. IV, 1862, p. 25.
Pomacentrus taeniometopon Günther, l.c.
Pomacentrus trilineatus Peters, Monatsber. Akad. Berlin 1868, p. 271.
Pomacentrus taeniometopon Kner, Sitzber. Akad. Wien LVIII, 1868, p. 348.

Pomacentrus trilineatus Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 522.

Pomacentrus dorsalis Bleeker, Ned. Tijdschr. Dierk. IV (1871) 1872, p. 136.

Pomacentrus bilineatus Castelnau, Proc. Zool. Soc. Victoria, 1873, p. 89.

Pomacentrus biocellatus Von Martens, Preuss. Exp. Ost-Asien. Zool. I, 1876, p. 396.

Pomacentrus dorsalis Von Martens, l.c.

Pomacentrus dimidiatus Bleeker, Versl. Akad. Amsterdam (2) X (1876) 1877, p. 385.

Pomacentrus (*Pseudopomacentrus*) *trilineatus* Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 60. — Atl. Ichth. IX, 1877, Tab. 406, figs. 1—6.

Pomacentrus (*Pseudopomacentrus*) *dimidiatus* Bleeker, ibid. p. 63. — ibid. Tab. 406, fig. 8.

Pomacentrus obscurus Alleyne & Macleay, Proc. Linn. Soc. New S. Wales I, 1877, p. 343 (nec Thiollière).

Pomacentrus trilineatus Day, Fishes of India, Part III, 1877, p. 382.

Pomacentrus bankanensis Day, ibid. p. 383.

Pomacentrus littoralis Day, l.c. (partim?).

Pomacentrus bankanensis Macleay, Proc. Linn. Soc. New S. Wales II, 1878, p. 361.

Pomacentrus trilineatus Klunzinger, Sitzber. Akad. Wien, 1880, p. 396.

Pomacentrus Bankanensis Macleay, Descr. Cat. Austr. Fish. II, 1881, p. 64.

Pomacentrus bilineatus Macleay, l.c.

Pomacentrus trilineatus Macleay, Proc. Linn. Soc. New S. Wales IX, 1884, p. 44.

Pomacentrus trilineatus Sauvage, Poissons de Madagascar, 1891, p. 423.

Pomacentrus trilineatus Steindachner, Abh. Senckenb. naturf. Ges. XXV, 1901, p. 439.

Pomacentrus trilineatus Jordan & Snyder, Proc. U. S. Nat. Mus. XXIII, 1901, p. 753.

Pomacentrus tripunctatus Jordan & Snyder, ibid. XXIV (1901) 1902, p. 604.

Pomacentrus bankanensis Johnstone, Pearl Oyster Rep. II. Fishes, 1904, p. 212.

Pomacentrus delurus Evermann & Seale, Bull. Bur. Fish. XXIV, 1906, p. 89.

Pomacentrus tripunctatus Jordan & Seale, ibid. XXVI (1906) 1907, p. 27.

Pomacentrus emarginatus Jordan & Richardson, ibid. XXVII (1907) 1908, p. 263.

Pomacentrus dorsalis Snyder, Proc. U. S. Nat. Mus. XLII, 1912, p. 504.

Pomacentrus trilineatus M. Weber, Siboga Exp. Fische 1913, p. 337.

Pomacentrus dorsalis Jordan, Tanaka & Snyder, Journ. Coll. Sc. Univ. Tokyo XXXIII, Art. 1. 1913, p. 196.

Pomacentrus grammorhynchus Fowler, Proc. Acad. Nat. Sc. Philadelphia LXX, 1918, p. 44.

Pomacentrus trilineatus Ahl, Blätter f. Aquarien- und Terrarienkunde XXXVI, 1925, N⁰ 6.

Pomacentrus tripunctatus Barnard, Ann. S. Afric. Mus. XXI, 1925—1927, p. 734.

Pomacentrus dorsalis Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 55.

Pomacentrus tripunctatus Montalban, ibid. p. 56.

Pomacentrus simsiang Montalban, ibid. p. 59.
Pomacentrus wardi Whitley, Rec. Austr. Mus. XV, 1927, p. 301. — ibid. XVI, N⁰ 1, 1927, p. 17.
Pomacentrus macleayi Whitley, ibid. XVI, N⁰ 4, 1928, p. 221.
Pomacentrus tripunctatus Fowler & Bean, Proc. U. S. Nat. Mus. LXXI, Art. 10, 1927, p. 9. — Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 89.
Pomacentrus grammorhynchus Fowler & Bean, ibid. 1928, p. 97.
Pomacentrus tripunctatus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 311.
Pseudopomacentrus macleayi Whitley, Mem. Queensl. Mus. IX, Part III, 1929, p. 236.
Pseudopomacentrus Wardi Whitley, ibid. p. 237.
Pseudopomacentrus bilineatus Whitley, l.c.
Pseudopomacentrus bankanensis Whitley, ibid. p. 238.
Pseudopomacentrus wardi macleayi Whitley, Rep. Great Barrier Reef. Exp. Brit. Mus. IV, N⁰ 9, 1932, p. 291.
Pomacentrus wardi Fowler, Mem. B. P. Bishop Mus. XI, N⁰ 6, 1934, p. 433.
Pomacentrus tripunctatus Herre, Notes Fish. Zool. Mus. Stanf. Univ. 1934, p. 71.
Pomacentrus dorsalis Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 283.
Pomacentrus tripunctatus Herre, ibid. p. 284.
Pomacentrus simsiang Herre, ibid. p. 286.

D. XIII. 13—15. A. II. 14 (15). P. 2. 15. Ll. 16—18 + 7—8. Ltr. $\begin{array}{c}2\\\hline 1\\\hline 9\end{array}$. Sq. l. 27—28.

Height 2—2.2, 2.5—2.8 in length with caudal. Head 3—3.2, 4—4.5 in length with caudal. Length of head 1.1—1.2 in its height. Eye 3.3—4.3, 0.8—1.1 in snout and 1.1—1.4 in convex interorbital space. Mouth oblique. Maxillary reaching to below frontborder of eye in young, in adults somewhat beyond vertical through nostril. Preorbital and suborbital naked, the preorbital with 3—6 spines, directed backwards, the suborbital much narrower and with shorter denticulations. In young ones the preorbital has one flat spine only and the serrations on the suborbital are less distinct. Three transverse rows of scales on preopercle, sometimes only two rows near narrow posterior limb, which is naked. Inferior limb scaly. Hindborder of preopercle coarsely serrated. Scales on upper part of head reaching to between nostrils. Dorsal spines increasing in length to the fourth, following spines subequal or the posterior ones slightly longer. Last spine about equal to postorbital part of head. Soft dorsal rather pointed, the 8th or 9th rays longest and equal to head without snout. First anal spine equal to or a little less than half length of second, which is as long as but stronger than last dorsal spine. Soft anal somewhat more rounded than soft dorsal, its longest rays as long as those of dorsal. Pectorals half length of snout shorter than head. Ventrals with the first ray produced, somewhat longer than head. Caudal forked, the lobes slightly pointed in young, rounded in adults. Colour of preserved specimens darker or lighter brown, fins generally of a darker colour. Caudal sometimes yellow and distal half of dorsal and anal sometimes dusky or whitish. Anal sometimes with one or two whitish longitudinal bands in young. A dark spot at origin of lateral line, another on superior part of base of pectoral, and third on upper part of caudal peduncle, immediately behind dorsal. The last spot often with a white anterior border in young. One, two, or all three spots may be absent. In young specimens there are generally white or bluish lines, running from snout above, through and below eye. The upper ones continued as rows of spots along back and often reaching a dark, white edged ocellus on the dorsal. This ocellus is sometimes situated in the anterior, sometimes in the posterior part of the soft dorsal. It generally disappears, but sometimes remains visible as a distinct or faint dark spot. White or bluish spots may also be present in young on all the scales of the body and tail, and of the scales of the dorsal and anal sheaths. In semi adults traces of bands on the head and of the spots on body and tail, especially on caudal peduncle, may still be visible. In very young specimens the ventral spine may also be white or bluish. Length 131 mm.

Habitat: Singapore; Pulu Brani; Sumatra (Benkulen, Lampassing, Kauer, Ulakan, Padang!, Priaman, Siboga); Simalur!; Batu Islands; Nias!; Pulu Berhala!; Banka; Biliton; Duizend Islands!; Java (Batavia!, Prigi); Madura!; Bawean; Bali; Celebes (Badjoa, Menado, Kema, Gorontalo, Cape Kait, Sadaa, Labuandata Bay); Basa Reef, Gulf of Boni; Togian Islands; Kabala dua, Borneo Bank!; Muaras Reef!; Sulu Islands!; Siau!; Karkaralong Islands!; Sangi Islands; Talaut Islands!; Saleyer!; Flores!; Solor; Savu!; Rotti!; Samau!; Timor!; Ternate; Tidore; Makian; Halmahera!; Salomakië!; Doworra; Gomomo; Buru; Ceram!; Ambon!; Nusa Laut!; Haruko; Goram; Gébé; Banda!; Tiur!; Aru Islands; Waigeu!; Weeim; Schouten Islands; New Guinea (Manokwari, Humboldt Bay!, Mandated Territory). — Madagascar, Mozambique, Zanzibar, Red Sea, Aden, Seychelles, Gulf of Manaar, Andamans, Nicobars, Japan, China, Riu Kiu Islands, Pulu Tikus, Philippines, Pelew Islands, Guam, Bismarck Archipelago, Solomon Islands, Vanicolo, New Hebrides, North Australia, Fiji, Rotuma.

In sea, on reefs, in estuaries, and even entering fresh water.

Note. This species is very variable and probably the list of synonyms given above is not even complete. I have excluded *Pomacentrus chrysurus,* as Sauvage l.c., who examined the type, considers it to be a different species. Whitley (1932, l.c.) is of opinion, that most of these varieties can be considered as geographical forms, and he has been able to group the Australian ones in a northern and a southern subspecies. At the hand of my material from the Indo-australian Archipelago it has not been possible to find varieties, which are geographically bound. It may be possible that when statistical methods are employed, f.i. based on the number of fin rays, geographical forms could be detected, but for such a research a very large material, covering the whole range of the species, would be necessary. The colour varieties are according to my experience mainly due to age. Montalban l.c. has described the changes from the juvenile to the adult coat, and in general I agree with his results. It seems to me that in some cases traces of the juvenile markings remain longer than in others and I have reason to believe that in some populations this tendency to retain the juvenile dress is more developed than in others.

Doubtful species

1. **Pomacentrus rhodonotus** Blkr.

Pomacentrus rhodonotus Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 282. — Atl. Ichth. IX, 1877, Tab. 405, fig. 2.

D. XIII. 15 (16). A. II. 15 (16) P. 2. 15. V. I. 5. Sq. l. about 24.

Scales on upper part of head reaching beyond interorbital space. A notch between pre- and suborbital, which are scaleless and have a smooth lower border. Hindborder of preopercle slightly denticulated. Teeth in two rows. Caudal emarginate. Colour of upper part of head, nape and anterior part of back reddish brown, rest of head and body blackish violaceus. Spinous dorsal orange red, soft dorsal violaceus with a large black ocellus, edged with margaritaceous, between last spine and 6th ray. Anal blackish violet. Caudal orange with a violaceous hue. Pectorals and ventrals violaceous. Length 27 mm.

Bleeker based this description on a single juvenile specimen. As several important characteristics remain unmentioned, it is impossible to place it among the other species. It may be the young of one of the species described above.

2. **Pomacentrus rectifraenum** Gill

Pomacentrus rectifraenum Gill, Proc. Acad. Nat. Sc. Philadelphia, 1862, p. 148.
Pomacentrus rectifraenum Günther, Cat. Brit. Mus. IV, 1862, p. 26.
Pomacentrus rectifraenum Von Martens, Exp. Ost-Asien. Zool. I, 1876, p. 396.
Eupomacentrus rectifrenum Jordan & Evermann, Fishes of North and Middle America. II, 1898, p. 1553.
Pomacentrus rectifraenum Duncker & Mohr, Mitt. Zool. Mus. Hamburg XLIV, 1929, p. 67.

This species, which is evidently very near *P. lividus* and *nigricans,* is an inhabitant of rock pools along the coast of Lower California and Central America.

The record of this species from Ambon by Von Martens l.c. and from New Britain by Duncker & Mohr l.c. is open to doubt, as most Indo-Pacific species do not reach the coast of America. Without having seen the specimens from Ambon and New Britain I therefore think it safer to range this species amongst the doubtful ones than to include it in the list from the Indo-Pacific Region.

6. **Abudefduf** Forskål

(Forskål, Descr. Animalium, 1775, p. 59)

Glyphisodon Lacepède, Hist. Nat. Poissons IV, 1803, p. 542.
Chrysiptera Swainson, Nat. Hist. Fish etc. II, 1839, p. 216.
Stegastes Jenyns, Voyage Beagle, Fish. 1842, p. 63.
Euschistodus Gill, Proc. Acad. Nat. Sc. Philadelphia, 1862, p. 145.
Hemiglyphidodon Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 91.
Amblyglyphidodon Bleeker, ibid. p. 92.
Paraglyphidodon Bleeker, ibid. p. 116.
Glyphidodontops Bleeker, ibid. p. 128.

Oblong or somewhat elongate, compressed. Scales rather large, less than 30 in a longitudinal series between head and caudal. Head scaly, the scales on upper part reaching to end of nostrils, or to interorbital space. Cheeks scaly. Vertical fins with a scaly sheath. Mouth moderate or small, slightly protractile. Teeth compressed, more or less incisiviform, the edges truncate or rounded, in one or two series in the jaws. Hindborder of preopercle smooth or rugose, but never with distinct serrations. Preorbital and suborbital with a smooth lower border, seldom rough. Operculum with or without a small flat spine. Lateral line formed by tubes in its anterior part, which runs parallel to the back and ends below dorsal, sometimes continued for a few scales as pores. On the tail the lateral line is developed as more or less distinct pores. Dorsal consisting of XII—XIV spines and 10—18 rays. Anal with II spines and 10—16 soft rays. Pectorals rounded. Caudal emarginate or forked.

Distribution. Tropical and subtropical parts of Atlantic, Pacific, Indic, and the Red Sea.

Note. This genus differs from *Pomacentrus* only in lacking denticulations on the preopercle, preorbital, and suborbital. The two lastnamed bones however have a smooth border in many species of *Pomacentrus,* and other species, which have the hindborder of the preopercle rough, have variously been placed in *Pomacentrus* and *Abudefduf*. Moreover, as has already been remarked (vide antea, p. 353), the serrations vary with age, and hence it seems doubtful if the genus *Abudefduf* can be retained. Since Cuvier the two genera have been recognised, and I admit that this and the fact that I have only studied the Indo-australian species have prevented me to unite the two.

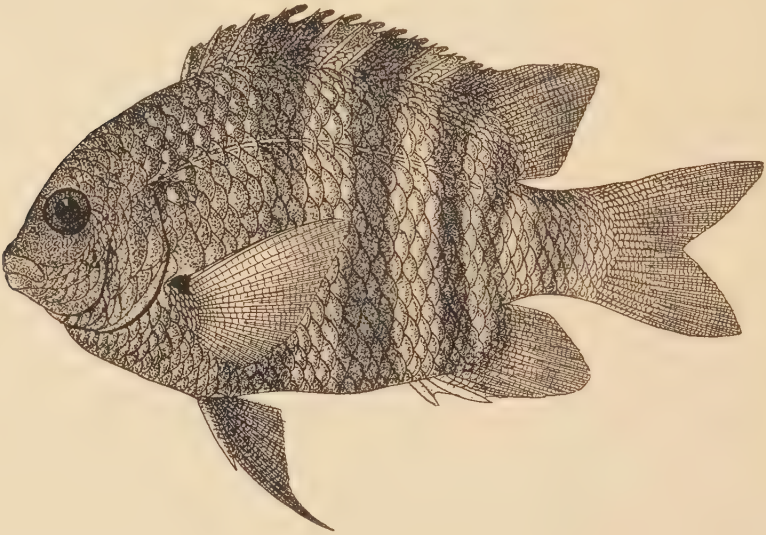

Fig. 49. *Abudefduf septemfasciatus* (C. V.) × 2/3

Key to the Indo-australian species of Abudefduf

- I. Thirteen dorsal spines.
  - A. 3—4 scales between lateral line and scaly sheath of dorsal below last spine. Teeth uniserial. Body with transverse bands.
    - *a.* Scales on head reaching to anterior part of interorbital space, not reaching nostrils. Inferior and posterior preopercular limb naked. Three transverse rows of scales on preopercle. Preorbital naked, suborbital more or less scaly.
      - *a'.* Fifteen dorsal rays. A black saddle on caudal peduncle. . . 1. *A. sordidus* p. 399.
      - *b'.* Thirteen dorsal rays. A black saddle on caudal peduncle in young only . . . . 2. *A. septemfasciatus* p. 401.
    - *b.* Scales on head reaching to nostrils. Preorbital naked. Suborbital more or less scaly.
      - *a'.* Inferior preopercular limb naked. Six transverse bands, narrower than interspaces. 3½ or 4½ rows of scales on preopercle. Caudal lobes rounded . . . . 3. *A. bengalensis* p. 403.
      - *b'.* Inferior preopercular limb scaly. Five transverse bands, not much narrower than interspaces. 2½ or 3½ rows of scales on preopercle. Caudal lobes pointed. . 4. *A. saxatilis vaigiensis* p. 404.
      - *c'.* Inferior preopercular limb scaly. One or two, seldom four very narrow transverse bands on body. Caudal lobes pointed. . . . . 5. *A. notatus* p. 408.
    - *c.* Scales on head reaching to beyond nostrils, almost to tip of snout. Preorbital and suborbital scaly. Posterior and inferior preopercular limbs scaly. 3½ rows of scales on preopercle. Each caudal lobe with a median longitudinal dark band. . 6. *A. coelestinus* p. 409.
  - B. 1½ or 2 scales between lateral line and scaly sheath of dorsal below last spine.
    - *a.* Hindborder of preopercle jagged. Caudal lobes long and pointed, sometimes filamentous. Ten to twelve dorsal rays.

- a'. Dorsal very dark, except the posterior part, which is white. Caudal light . . . . 7. *A. bankieri* p. 411.
- b'. Dorsal dusky. Caudal light, the inferior and superior rays dusky. 8. *A. anabatoides* p. 412.

b. Hindborder of preopercle completely smooth.

- a'. Scales on upper part of head reaching to nostrils or beyond. Inferior preopercular limb scaly.
  - a^2. 11—14 dorsal rays. Teeth uniserial. Gillrakers few and short.
    - a^3. Second anal spine as long as head without snout.
      - a^4. Median dorsal spines longer than the posterior ones.
        - a^5. Mouth oblique. Profile of snout not convex. Generally with transverse bands, formed by rows of dark spots on scales. 9. *A. curacao* p. 414.
        - b^5. Mouth very oblique. Profile of head convex. Dorsal and anal dark, except the posterior half of their soft parts . . 10. *A. leucogaster* p. 416.
      - b^4. Dorsal spines increasing in size posteriorly. Uniform yellowish . . 11. *A. aureus* p. 418.
    - b^3. Second anal spine less than head without snout. A dark blotch at base of pectoral.
      - a^4. Olive brown. Yellowish posteriorly. A blackish transverse band behind hindborder of preopercle. Ventrals dark . . 12. *A. filifer* p. 419.
      - b^4. Chocolate brown. Three dark transverse bands on head and thorax, leaving intermediate white bands. Ventrals light . . . . 13. *A. thoracotaeniatus* p. 420.
  - b^2. 12—16 dorsal rays. Teeth biserial. Gillrakers few and short.
    - a^3. Suborbital scaly.
      - a^4. A dark ocellus at base

of posterior dorsal spines . . . . 14. *A. bonang* p. 420.

b^4. No ocellus at base of posterior dorsal spines.

a^5. Two rows of scales on preopercle and a third on inferior limb.

a^6. Light, anal with a broad black terminal edge. Ventrals also dark. 15. *A. melanopus* p. 422.

b^6. Darker or lighter brown. A dark transverse band behind hindborder of preopercle 16. *A. behni* p. 422.

b^5. Three rows of scales on preopercle and a third on inferior limb.

a^6. Colour uniform dark . . . . 17. *A. melas* p. 424.

b^6. Colour dark, but posterior part of dorsal, and the whole caudal, light . . . . . . 18. *A. azysron* p. 425.

b^3. Suborbital scaleless 1).

a^4. Two transverse rows of scales on preopercle, the inferior limb scaly, 12 dorsal rays. Colour yellowish . . . . . . 19. *A. oxycephalus* p. 426.

b^4. Three transverse rows of scales on preopercle 1), the inferior limb scaly. 13—15 dorsal rays. Head and back light in life. Sides, tail, posterior part of soft dorsal, anterior part of anal, and median caudal rays dark. . . 20. *A. xanthonotus* p. 426.

c^1. Three transverse rows of scales on preopercle, the inferior limb naked. Brown, with oblique light bars . . . . . . 21. *A. oxyodon* p. 428.

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1) See note below *A. xanthonotus*, p. 427.

c^2. 14—15 dorsal rays. Teeth uniserial. Suborbital naked. Gillrakers long and numerous, 30—35+38—48 on the first arch . . . . 22. *A. plagiometopon* p. 428.

b'. Scales on upper part of head not reaching to nostrils. Colour generally more or less blue.

a^2. Inferior preopercular limb scaly . . . . 23. *A. hemicyaneus* p. 430.

b^2. Inferior preopercular limb naked, narrow. Two transverse rows of scales on preopercle.

a^3. A black blotch at base of median dorsal rays. Caudal somewhat emarginate, the lobes rounded . . . 24. *A. assimilis* p. 431.

b^3. No black blotch on dorsal. Caudal almost truncate. 25. *A. cyaneus* p. 432.

c^2. Inferior preopercular limb naked, broad.

a^3. Two transverse rows of scales on preopercle. Grey, spotted with grey blue. Anal with 2 submarginal greyish lines. 26. *A. bleekeri* p. 433.

b^3. Three transverse rows of scales on preopercle. Dark, with one light transverse band through opercle. A second oblique one from spinous dorsal to vent, and a third on caudal peduncle. Sometimes another band between the second and third . . . . 27. *A. xanthozona* p. 434.

c^3. Three transverse rows of scales on preopercle. Colour very variable. If light transverse bands present only one straight band below spinous dorsal. Often ocelli or dark patches at end of soft dorsal and on posterior spines. Sometimes almost uniform . . . . 28. *A. biocellatus* p. 436.

II. Twelve dorsal spines.

A. 15—18 dorsal rays, 12—15 anal rays.

a'. Snout scaly. Deep brown, caudal peduncle and caudal yellowish.

Head and body with scattered blue spots. A black blotch on median part of spinous dorsal only present in young. Scaly sheath of dorsal very thick . . . . 29. *A. lacrymatus* p. 439.

b'. Snout scaly. Reddish brown, some of the scales with light spots. A light transverse band below spinous dorsal generally present. A black, white edged ocellus at base of posterior dorsal spines present in young ones, sometimes obsolete in adults. A black blotch on back of caudal peduncle, and at base of pectoral superiorly . . . . 30. *A. leucozona* p. 440.

c'. Snout scaly. A black band from base of soft dorsal to anal, the tail behind this band light, the body before the band darker. . . . . 31. *A. dickii* p. 442.

d'. Front half of snout naked. Dark with three white transverse bands on body and a black one on caudal peduncle, bordered by white. . . 32. *A. albofasciatus* p. 443.

B. 13—14 dorsal rays, 15—16 anal rays. 33. *A. batjanensis* p. 444.

C. 11 dorsal rays, 12 anal rays. Silvery gray, a black spot above and below the root of the tail, extremities of dorsal and anal blackish . . . . 34. *A. bimaculatus* p. 445.

1. **Abudefduf sordidus** (Forsk.)

Chaetodon sordidus Forskål, Descr. Animalium, 1775, p. 62.
Pomacentrus sordidus Lacepède, Hist. Nat. Poissons IV, 1802, p. 517, p. 519.
Pomacentrus sordidus Rüppell, Atlas Reise N. Afrika. Fische. 1828, p. 34.
Glyphisodon sordidus Cuvier & Valenciennes, Hist. Nat. Poissons V, 1830, p. 466.
Glyphisodon sordidus Bleeker, Verh. Bat. Gen. XXI, 1847. Labr.cten, p. 16.
Glyphidodon sordidus Günther, Cat. Brit. Mus. IV, 1862, p. 41.
Glyphidodon sordidus Kner, Novara Exp. Fische. 1865, p. 245.
Glyphidodon sordidus Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 525.
Glyphidodon sordidus Day, Fishes of India, Part III, 1877, p. 385.
Glyphidodon (*Glyphidodon*) *sordidus* Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 95. — Atl. Ichth. IX, 1877. Tab. 410, fig. 5.
Glyphidodon sordidus Günther, Fische der Südsee II, 1881, p. 231.
Glyphisodon sordidus Sauvage, Poissons de Madagascar, 1891, p. 430.
Glyphidodon sordidus Waite, Mem. Austr. Mus. III, 1899, p. 192.
Glyphisodon sordidus Jordan & Snyder, Proc. U. S. Nat. Mus. XXIV (1901) 1902, p. 610.

Abudefduf sordidus Jordan & Evermann, Bull. Fish. Comm. XXIII (1903) 1905, p. 274.

Abudefduf sordidus Jordan & Seale, Bull. Bur. Fish. XXV (1905) 1906, p. 284.

Glyphidodon sordidus Gilchrist & Thompson, Ann. S. Afric. Mus. VI, Part 2, 1908, p. 196.

Abudefduf sordidus Kendall & Radcliffe, Mem. Mus. Comp. Zool. Harvard Coll. XXXV, N⁰ 3, 1912, p. 133.

Abudefduf sordidus Jordan, Tanaka & Snyder, Journ. Coll. Sc. Univ. Tokyo XXXIII, Art. 1, 1913, p. 193.

Abudefduf sordidus M. Weber, Siboga Exp. Fische 1913, p. 247.

Glyphisodon sordidus McCulloch & Waite, Trans. Roy. Soc. S. Austr. XL, 1916, p. 444.

Abudefduf sordidus Jordan & Jordan, Mem. Carnegie Mus. X 1922—1925. p. 68.

Glyphisodon sordidus Barnard, Ann. S. Afric. Mus. XXI, 1925—1927, p. 737.

Abudefduf sordidus Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 77.

Abudefduf sordidus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 132.

Abudefduf sordidus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 317.

D. XIII. 15. A. II. 14—15. P. 2. 15—16. V. I. 5. Ll. 22 + 0. Ltr. $\begin{array}{c}3-3\frac{1}{2}\\ \hline 1\\ \hline 13\end{array}$. Sq. l. 28.

Height 1.7—1.9, 2.1—2.4 in length with caudal. Head 2.9—3, 3.7—4 in length with caudal. Length of head 1—1.3 in its height. Eye 3.4—4.1, 1.1—1.5 in snout and 1.1—1.5 in slightly convex interorbital space. Mouth oblique, reaching to below nostril. Teeth truncate, in a single series. No notch between pre- and suborbital, the edges of which are smooth. A few scales posteriorly on suborbital. Height of suborbital below middle of eye one half, or one third in young specimens, of eye diameter. Three transverse rows of scales on preopercle, a broad inferior and a somewhat narrower posterior limb naked. Scales on upper part of head reaching to anterior part of interorbital space, not reaching nostrils. First dorsal spine equal to eye, less than eye in young. Third and fourth dorsal spines generally longest, equal to snout and eye in young, half diameter of eye shorter in adults. Spines decreasing in size posteriorly, the last one equal to eye, in some specimens the posterior spines are only slightly shorter than the longest. Median dorsal rays longest, equal to snout and eye. First anal spine less than half length of second, which is equal to snout in adults, and one eye diameter longer in young ones. Soft anal similar to soft dorsal. Ventrals with the first ray produced into a filament, subequal to pectorals and almost as long as head. Caudal moderately forked, the lobes rounded. Four scales between lateral line and scaly sheath of dorsal below last spine. Colour of preserved specimens brownish above, yellowish and more or less silvery below. Four or five narrow vertical light bands below dorsal. A black saddle, sometimes surrounded by white, on the caudal peduncle immediately behind dorsal. A black blotch superiorly at base of pectoral generally present. In adults the scales behind the eye and on nape have often each a dark blotch, those on nape forming a more or less distinct transverse band. Vertical fins brownish red or yellowish, in young ones the anterior part of the dorsal may be dark. Ventrals dark. Pectorals hyaline. Length 210 mm.

Habitat: Sumatra (Padang); Biliton; Java (Karangbollong, Pagotang, Labuan Batu, Batu Ule!); Talaut Islands!; Obi major; Sumba!; Ambon; Aru Islands; New Guinea (North Coast of Papua). — Coast of Natal and Zululand, Madagascar, Zanzibar, Red Sea, Mauritius, Réunion, Seychelles, Arabian Sea, Coast of British India, Andamans, Nicobars, Christmas Island, Siam, China, Japan, Riu Kiu Islands, Formosa, Philippines, Marcus Island, Raine Island, Queensland, New Hebrides, New Caledonia, Lord Howe Island, Norfolk Island, Ellice Islands, eastwards to Hawaii, Marquesas Islands, Paumotu Islands, and Society Islands. In sea, in rock pools, apparently not on coral reefs.

2. **Abudefduf septemfasciatus** (C. V.) (Fig. 49, p. 394)

Glyphisodon septemfasciatus Cuvier & Valenciennes, Hist. Nat. Poissons V, 1830, p. 463.
Glyphisodon septemfasciatus Bleeker, Nat. Tijdschr. Ned. Indië III, 1852, p. 582.
Glyphidodon septemfasciatus Günther, Cat. Brit. Mus. IV, 1862, p. 40.
Glyphidodon septemfasciatus Day, Fishes of India, Part III, 1877, p. 386.
Glyphidodon (Glyphidodon) septemfasciatus Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 97. — Atl. Ichth. IX, 1877. Tab. 409, fig. 5.
Glyphidodon septem-fasciatus Günther, Fische der Südsee II, 1881, p. 230.
Abudefduf septemfasciatus Seale, Occas. Papers B. P. Bishop Mus. I, 1901, p. 82.
Abudefduf septemfasciatus Steindachner, Sitzber. Akad. Wien CXV, 1906, p. 1395.
Abudefduf septemfasciatus Jordan & Seale, Bull. Bur. Fish. XXV (1905) 1906, p. 285.
Abudefduf septemfasciatus M. Weber, Siboga Exp. Fische 1913, p. 347.
Abudefduf septemfasciatus Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 79.
Abudefduf septemfasciatus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 135.

Abudefduf septemfasciatus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 317.
?*Abudefduf saxatilis* Fowler, Proc. Acad. Nat. Sc. Philadelphia LXXXVII, 1936, p. 157, fig. 124 (nec L.).

D. XIII. 13. A. II. 12—13. P. 2. 16—17. V. I. 5. Ll. 21—22 + 7—9. Ltr. $\begin{array}{c}3-3\frac{1}{2}\\ \hline 1\\ \hline 11-12\end{array}$. Sq. l. 28.

Height 1.8—1.9, 2.3—2.4 in length with caudal. Head 3—3.2, 3.9—4.3 in length with caudal. Length of head 1.2—1.3 in its height. Eye 3.3—3.7, 1—1.4 in snout and 1—1.5 in slightly convex interorbital space. Mouth oblique. Maxillary reaching to below space between nostril and eye. Teeth truncate, slightly bilobed in young, in a single series. No notch between pre- and suborbital, the edges of which are smooth. Preorbital naked, suborbital with a row of scales. Height of suborbital below middle of eye more than twice in eye in young specimens, less than twice in large ones. Three transverse rows of scales on preopercle, a broad inferior and a somewhat narrower posterior limb naked. Scales on upper part of head reaching to between eyes, not reaching nostrils. First dorsal spine equal to eye or somewhat shorter, 6th to 8th dorsal spines subequal, longest, and equal to snout and eye together in young ones, half diameter of eye shorter in adults. Soft dorsal higher than spinous part, the median rays longest and equal to head without snout. First anal spine less than half length of second, which is as long as longest dorsal spines. Soft anal similar to soft dorsal. Ventrals with the first ray somewhat produced, about as long as pectorals and equal to length of head. Caudal forked, the lobes moderately pointed. Four scales between lateral line and scaly sheath of dorsal below last spine. Colour of preserved specimens yellowish, the scales of body and tail with a dark hindborder. In young ones many scales of the sides and belly are more or less silvery. Seven transverse dark bands, the first behind eye, the second on nape, these two generally distinct only in young specimens. The third to sixth below dorsal, the seventh on caudal peduncle, much darker superiorly in young and forming a saddle. Spinous dorsal dark brown at its base and along its edge, lighter in the middle. Soft dorsal, anal, and caudal brown at base, yellowish distally. Pectorals yellow, with a triangular black spot at their base superiorly. Ventrals greyish basally, yellowish distally. Length 180 mm.

Habitat: Pulu Weh!; Sumatra (Benkulen, Trussan, Padang, Ulakan, Priaman, Siboga); Nias!; Java (Karangbollong, Pagotang, Palabuhanratu!, Prigi); Strait Madura!; Kangean Islands!; Celebes

(Menado, Gorontalo); Sangi Islands; Talaut Islands!; Lombok!; Sumba!; Buru; Ambon; Adonare!; Timor. — Madagascar, Zanzibar, Mauritius, Seychelles, Coast of British India, Ceylon, Burma, Siam, China, Philippines, Guam, Solomon Islands, Raine Island, Queensland, New Hebrides!, Marshall Islands, Gilbert Islands, Ellice Islands, Samoa, Tonga Islands, Cook Islands, Society Islands, Paumotu Islands. In sea.

3. **Abudefduf bengalensis** (Bl.)

Chaetodon bengalensis Bloch, Naturgesch. Ausländ. Fische III, 1787, p. 110.
Glyphisodon bengalensis Cuvier & Valenciennes, Hist. Nat. Poissons V, 1830, p. 458 (partim).
Glyphisodon bengalensis Schlegel & Müller, Verh. nat. gesch. Ned. overz. Bezitt. Zool. 1839—1841. Overzigt Amphiprion etc. p. 22.
Glyphisodon bengalensis Bleeker, Verh. Bat. Gen. XXI, 1847, Labr. cten, p. 11.
Glyphidodon bengalensis Günther, Cat. Brit. Mus. IV, 1862, p. 41.
Glyphidodon affinis Günther l.c.
Glyphidodon bengalensis Kner, Novara Exp. Fische, I. 1865, p. 244.
Glyphidodon (Glyphidodon) bengalensis Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 99. — Atl. Ichth. IX, 1877. Tab. 407, fig. 4.
?*Glyphidodon bengalensis* Day, Fishes of India, Part III, 1877, p. 387.
Abudefduf bengalensis M. Weber, Siboga Exp. Fische 1913, p. 344.
Abudefduf bengalensis Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 80.
Abudefduf bengalensis Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 128.
Abudefduf bengalensis Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 316.
Abudefduf sexfasciatus Chevey, Trav. Inst. Océan. Indochine. Mém. IV, 1932, p. 103 (nec Lac.).
?*Abudefduf saxatilis* Fowler, Proc. Acad. Nat. Sc. Philadelphia LXXXVII, 1936, p. 156 (nec L.).
Abudefduf bengalensis Hora & Mukerji, Rec. Indian Mus. XXXVIII, Part I, 1936, p. 27.
Abudefduf bengalensis Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 291.

D. XIII. 13—15 1). A. II. 13—15 1). P. 2. 16. V. I. 5. Ll. 21 + 8. Ltr. $\begin{array}{c}3\frac{1}{2}-4\\ \hline 1\\ \hline 11-12\end{array}$. Sq. l. 28.

Height 1.6—1.7, 2.2—2.3 in length with caudal. Head 3—3.2, 4—4.3 in length with caudal. Length of head 1.3—1.5 in its height. Eye 3.1—3.4, 1—1.1 in snout and 1—1.3 in somewhat convex interorbital space. Mouth oblique. Maxillary reaching to below nostril. Teeth truncate, slightly bifid in young, in a single series. No notch be-

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1) In one specimen from Pulu Weh I find D. XIV. 11 and A. III. 11.

tween pre- and suborbital, the edges of which are smooth. Preorbital naked, suborbital with a few scales posteriorly. Height of suborbital below middle of eye one third to one fourth of diameter of eye. $3^1/_2$ to $4^1/_2$ transverse rows of scales on preopercle, the posterior and inferior limbs naked. Scales on upper part of head reaching to or almost to nostrils, the anterior scales not much smaller than the others. First dorsal spine less than eye, third and following subequal, longest, and as long as snout and half eye. Soft dorsal pointed, much higher than spinous part, the longest rays almost equal to head. First anal spine less than second, which is equal to snout and half eye or to snout and eye in young ones. Soft anal pointed, less deep than dorsal, the longest rays equal to head without snout. Pectorals equal to head, ventrals with the first ray produced, longer than head. Caudal forked, the lobes rounded. Three or four scales between lateral line and scaly sheath of dorsal below last spine. Colour of preserved specimens bluish or brownish above, silvery below, the scales with or without a dark hindborder, and the colour of body and tail therefore very variable, lighter or darker. Seven dark brown transverse bands, narrower than the interspaces; the first on nape, the second below origin of dorsal, the third below 5th dorsal spine, the fourth below 8th spine, the fifth below last spine. The sixth band immediately behind dorsal on caudal peduncle and the seventh at base of caudal. The first and the last bands sometimes indistinct. Vertical fins dark brown, sometimes lighter basally. Ventrals dark greyish, pectorals light yellow, with a triangular black spot at its base superiorly. Length 160 mm.

Habitat: Pulu Weh!; Singapore; Bintang; Banka; Biliton; Java (Batavia!, Bantam, Karangbollong); Duizend Islands!; Postillon Islands!; Borneo (Sandakan); Celebes (Makassar, Gorontalo); Sangi Islands; Flores!; Sumbawa; Ambon; New Guinea (Geelvink Bay). — Madagascar, Red Sea?. Coasts of British India?, Andamans?, Siam?, Indochina, China, Japan, Philippines, Pelew Islands, Solomon Islands, Santa Cruz Islands, Ellice Islands, Samoa. In sea.

4. **Abudefduf saxatilis vaigiensis** (Q. G.)

?*Chaetodon rotundus* Linné, Syst. Nat. Ed. 10. 1758, p. 277.
?*Labrus sexfasciatus* Lacepède, Hist. Nat. Poissons III, 1802, p. 430.
Glyphisodon vaigiensis Quoy & Gaimard, Voyage de l'Uranie et de la Physicienne, Zool. 1824, p. 391.

Glyphisodon rahti Cuvier & Valenciennes, Hist. Nat. Poissons V, 1830, p. 456. — ibid. IX, 1833, p. 507.

Glyphisodon waigiensis Cuvier & Valenciennes, ibid. V, 1830, p. 457.

Chaetodon tyrrwhitti Bennett, Fishes of Ceylon, 1834, N⁰ 25.

Glyphisodon rahti Schlegel & Müller, Verh. nat. gesch. Ned. overz. Bezitt. Zool. 1839—1841. Overzigt Amphiprion etc. p. 22.

Glyphisodon waigiensis Bleeker, Verh. Bat. Gen. XXI, 1847. Labr. cten. p. 13.

Glyphisodon quadrifasciatus Bleeker, ibid. p. 17.

Glyphisodon rahti Cantor, Journ. Asiat. Soc. Bengal XVIII, 1850, p. 1224 (partim).

Glyphisodon rahti Bleeker, Nat. Tijdschr. Ned. Indië III, 1852, p. 287.

Glyphidodon coelestinus Günther, Cat. Brit. Mus. IV, 1862, p. 38 (partim).

Glyphidodon saxatilis Kossmann & Räuber, Verh. Naturh. Med. Vereins Heidelberg I, 1876, p. 33.

?*Glyphidodon coelestinus* Day, Fishes of India, Part III, 1877, p. 386, (nec C. V.).

Glyphidodon coelestinus Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 101 (partim).

Glyphidodon saxatilis Günther, Fische der Südsee II, 1881, p. 229 (partim).

?*Glyphidodon coelestinus* Macleay, Descr. Cat. Austr. Fish. II, 1881, p. 66 (nec C. V.).

?*Glyphidodon waigiensis* Macleay, ibid. p. 67.

?*Glyphidodon saxatilis* Steindachner, Abh. Senckenb. naturf. Ges. XXV, 1901, p. 441.

Glyphisodon saxatilis Jordan & Snyder, Proc. U. S. Nat. Mus. XXIV (1901) 1902, p. 608.

Glyphidodon saxatilis Steindachner, Denkschr. Akad. Wien LXXI, 1902, p. 149.

Glyphisodon saxatilis Waite, Rec. Austr. Mus. V, N⁰ 4, 1904, p. 170 (partim).

Abudefduf saxatilis Jordan & Seale, Bull. Bur. Fish. XXV (1905) 1906, p. 285. — ibid. XXVI (1906) 1907, p. 28

Abudefduf saxatilis Jordan & Richardson, ibid. XXVII (1907) 1908, p. 263.

Glyphidodon coelestinus Gilchrist & Thompson, Ann. S. Afric. Mus. VI, Part 2, 1908, p. 190 (nec C. V.).

Abudefduf saxatilis M. Weber, Siboga Exp. Fische 1913, p. 345 (partim).

Abudefduf saxatilis saxatilis De Beaufort, Bijdr. Dierk. Afl. 19. 1913, p. 127.

Glyphisodon saxatilis McCulloch, Austr. Zoologist II, part 3, 1922, p. 95.

Glyphisodon saxatilis Barnard, Ann. S. Afric. Mus. XXI, 1925—1927, p. 736.

Glyphidodon coelestinus Vinciguerra, Ann. Mus. Civ. Genova (3) X, 1926, p. 565 (nec C. V.).

Abudefduf saxatilis Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 81.

Abudefduf saxatilis Fowler & Bean, Bull. U. S. Nat. Mus 100. Vol. VII, 1928, p. 124.

Abudefduf saxatilis Fowler, Mem. B. P. Bishop Mus X, 1928, p. 315.

Glyphisodon saxatilis McCulloch, Checklist Fish. Austr. Part II, 1929, p. 298.

Glyphisodon saxatilis Whitley, Mem. Queensl. Mus. IX, Part III, 1929, p. 240.

Abudefduf sexfasciatus Wu, Contr. Biol. Lab. Sc. Soc. China VII. Zool. Ser. 1931, p. 31.

?*Abudefduf saxatilis* Fowler, Hongkong Naturalist II 1931, p. 306.

Abudefduf saxatilis Fowler, Proc. Acad. Nat. Sc. Philadelphia LXXXVI, 1934, p. 491. — ibid. LXXXIX, 1937, p. 246.
Abudefduf saxatilis Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 291.

D. XIII. 12—13. A. II. 12—13. P. 2. 16—17. V. I. 5. Ll. 20—23+0—9. Ltr. $\frac{3\frac{1}{2}}{\frac{1}{11}}$. Sq. l. 28—29.

Height 1.7—1.9, 2.4—2.6 in length with caudal. Head 3.1—3.4, 4.2—4.6 in length with caudal. Length of head 1.2—1.5 in its height. Eye 3—3.6, equal to or somewhat more or less than snout and 1—1.3 in somewhat convex interorbital space. Mouth oblique. Maxillary reaching to below frontborder of eye or to below nostril in large specimens. Teeth truncate or slightly bifid, in a single series. No notch between pre- and suborbital, the edges of which are smooth. Preorbital naked, suborbital scaly posteriorly. Height of suborbital below middle of eye one fourth or one fifth of diameter of eye. $2^{1}/_{2}$ to $3^{1}/_{2}$ transverse rows of scales on preopercle, the inferior limb scaly. A narrow posterior limb naked. Scales on upper part of head reaching to between nostrils, the anterior scales smaller than the others. First dorsal spine somewhat less than eye, fourth to seventh spines longest, equal to snout and eye or somewhat less. Soft dorsal pointed, the longest rays slightly less than head. First anal spine less than half length of second, which is slightly longer than longest dorsal spines. Soft anal pointed, the longest rays slightly shorter than longest dorsal rays. Ventrals with the first ray produced, slightly shorter than pectorals and as long as head. Caudal deeply forked, the lobes pointed. Four scales between lateral line and scaly sheath of dorsal below last spine. Colour of preserved specimens bluish or brownish, lighter below, the scales of body and tail sometimes with a light, horizontal, median, streak. Five vertical dark brown or blackish bars, slightly less broad than the interspaces. The first on nape, immediately before dorsal, reaching to axil of pectoral; the second between 4th and 6th dorsal spines, ending before ventral median line; the third below 10th to 11th dorsal spines, almost reaching to origin of anal; the fourth below posterior spines and anterior rays, reaching on base of middle of anal; the fifth on middle of caudal peduncle. Dorsal and anal lighter or darker brown, the spinous dorsal sometimes almost black. Posterior part of soft dorsal and anal hyaline. A dark blotch at base of posterior dorsal rays may be present. Caudal dark or light brown, lighter distally. Pectorals yellowish hyaline, a triangular black spot at its base superiorly. Ventrals greyish. Length 183 mm.

Habitat: Pulu Weh!; Singapore; Pulu Berhala!; Sumatra (Kauer, Benkulen, Padang, Batu Sangkar, Siboga); Nias!; Banka; Biliton; Java (Batavia!, Patjitan, Karangbollong, Prigi, Batu Ule!); Bawean; Borneo (Sarawak, Sandakan); Bali; Postillon Islands!; Celebes (Makassar, Menado, Tanawanko, Tombariri, Bulukomba); Talaut Islands!; Sangi Islands; Buton!; Sula Islands!; Halmahera; Ternate; Makian; Batjan; Lombok!; Flores; Solor!; Savu!; Ambon; Nusa Laut!; Goram; Banda Sea!; Rotti!; Timor; Taam!; Aru Islands!; Waigeu!; New Guinea (Sorong!, Humboldt Bay!, Port Moresby). — Coast of Natal, Zanzibar, Red Sea, Arabian Sea, Coasts of British India, Ceylon, Siam, Tonkin, Paracels Islands, China, Japan, Formosa, Philippines, Marcus Island, Shortland Islands, Solomon Islands, New Hebrides, Lord Howe Island, Coasts of Queensland and New South Wales, Fiji, Samoa, Cook Islands, Tubuai, Society Islands, Paumotu Islands, Marquesas Islands, Galapagos Islands. In sea. On reefs, but the juvenile stage is pelagic.

Note. Lönnberg (Bihang Kongl. Svenska Vetensk. Akad. Handl. XXII. Afd. IV, N⁰ 2, 1897, p. 22) has examined the type of *Chaetodon saxatilis* L. and ascertained, that it is a specimen of the American *Glyphisodon saxatilis,* as described by Cuvier & Valenciennes (Hist. Nat. Poissons V, 1830, p. 446), and by Günther (Cat. Brit. Mus. IV, 1862, p. 35). Linné seems to have confounded the American and the Indian species, and in the 10th edition of the Systema Naturae "India" is recorded as the habitat. As has been pointed out by Cuvier & Valenciennes, Linné afterwards seems to have changed his opinion, for in the 12th edition he declares that the species is American. The name of the American species, which lately has been called *marginatus* Bloch, has to be changed in *saxatilis* again.

The Indian species however is so close to the American one, that they can be considered as belonging to geographical forms of the same species. I have compared a number of Atlantic specimens with specimens from the Indo-Pacific Region. I have not seen Pacific specimens from the American Coast, but according to Jordan & Evermann (Fishes of N. and Middle America II, 1898, p. 1561) they do not differ from Atlantic ones. Those of the Galapagos Islands seem to belong to the Western Pacific form (cf. Herre, l.c.).

The Indian species has been united with *coelestinus* C.V. by

Bleeker and several authors after him. The differences between these two species are not only differences of colour—*coelestinus* having the upper and lower caudal lobes marked by a longitudinal dark band—but the scales on the snout descend in *coelestinus* beyond the nostrils and the preorbital is scaled, whereas in the Indian as well as in the American subspecies of *saxatilis* the scales do not reach further than the nostrils, as has already been remarked by Herre, l.c. The preorbital is naked in my Indian and American specimens of *saxatilis,* but as the scales of this bone are rather deciduous in *coelestinus,* I do not lay much stress on this character.

As for the name of the Indian subspecies of *saxatilis* I think that *Glyphisodon Vaigiensis* Q.G. is the oldest name available. *Labrus sexfasciatus* Lac. may also be this species, but the description and the figure in the Hist. Nat. Poissons III, 1802, p. 430, and pl. 19, fig. 2, are unsufficient to decide this point. Cuvier & Valenciennes considered *sexfasciatus* as a synonym of their *coelestinus,* but as Lacepède does not mention the dark bands on the caudal, and as the figure shows this fin of an uniform dark colour, I doubt if Cuvier & Valenciennes and subsequent authors were right.

The differences between the Indian and American *saxatilis* can be formulated as follows:

A. Head and body deeper. Height 1.5—1.7. Length of head 1.3—1.6 in its depth. 5th transverse band below posterior end of dorsal and continued on the posterior dorsal rays . . . . *A. saxatilis saxatilis* (L.).

B. Head and body less deep. Height 1.8—1.9. Length of head 1.3—1.4 in its depth. 5th transverse band behind dorsal, on caudal peduncle . . . . *A. saxatilis vaigiensis* (Q. G.).

5. **Abudefduf notatus** (Day)

Glyphidodon notatus Day, Proc. Zool. London 1869, p. 521. — Fishes of India, Part III, 1877, p. 386.

Chrysiptera melas Jordan & Snyder, Proc. U. S. Nat. Mus. XXIV, 1902, p. 605 (partim).

Abudefduf clarki Snyder, ibid. XI, 1911, p. 534. — ibid. XLII, 1912, p. 419.

Abudefduf notatus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 136.

Abudefduf notatus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 318.

D XIII. 13. A. II. 13 (14). P. 2. 16. V. I. 5. Ll. 21 + 11. Ltr. $\begin{array}{c}4\\\hline 1\\\hline 10\end{array}$. Sq. l. 30.

Height 1.7—1.8, 2.4—2.5 in length with caudal. Head 3.1—3.5, 4.5—4.6 in length with caudal. Length of head 1.3 in its height. Eye 2.7—3.2, slightly more than snout and equal to or less than convex interorbital space. Mouth somewhat oblique. Maxillary reaching to below frontborder of eye or nearly so. Teeth crowded, in a single row; those of the upper jaw slightly compressed, rounded at tip; those of the lower jaw more compressed, tricuspid. Preorbital not notched, deeper than suborbital. A row of scales on suborbital, reaching on posterior part of preorbital. Three transverse rows of scales on preopercle and a fourth row on inferior limb. Posterior preopercular limb scaly. Scales on upper part of head reaching to nostrils. First dorsal spine less than eye, fourth to fifth spines longest, almost equal to snout and eye together. Soft dorsal pointed, the longest rays equal to snout and eye. First anal spine less than half length of second, which is as long as longest dorsal spine. Soft anal similar to soft dorsal. Pectorals as long as head, ventrals with the first ray produced into a filament, somewhat longer. Caudal forked, the lobes pointed. Three rows of scales between lateral line and scaly sheath of dorsal below last spine. Colour of preserved specimens deep brown, lighter below, thorax more or less silvery. Scales of sides of tail with a transverse silvery streak. A transverse silvery band, one scale broad, from below sixth or seventh dorsal spines to anal region, generally followed by a second one from below last dorsal spine to anterior part of anal. Two more similar bands may be present, especially in young specimens: one below anterior dorsal spines and one before dorsal. A large black blotch at origin of lateral line. Hindborder of opercle also often dark. In young ones the preorbital, suborbital, and all the opercular bones have a silvery edge. Dorsal and anal dark, the distal half of the soft part of both fins lighter. Caudal and pectorals light brown or yellowish. Ventrals dusky. Length 127 mm.

Habitat: Sumba!; Solor!. — Gulf of Manaar, Andamans, Japan, Philippines, Phoenix Islands, Marquesas Islands. On reefs, in sea.

6. **Abudefduf coelestinus** (C. V.)

?*Labrus sexfasciatus* Lacepède, Hist. Nat. Poissons III, 1802, p. 430.
Glyphisodon coelestinus Cuvier & Valenciennes, Hist. Nat. Poissons V, 1830, p. 464.
Glyphisodon coelestinus Schlegel & Müller, Verh. nat. gesch. Ned. Overz. Bezitt. Zool. 1839—1841. Overzigt Amphiprion etc. p. 22.
Glyphisodon caelestinus Bleeker, Verh. Bat. Gen. XXI, 1847. Labr. cten. p. 15.

Glyphisodon rathi Cantor, Journ. Asiatic. Soc Bengal XVIII, 1850 p. 1224 (partim).
Glyphidodon coelestinus Günther, Cat. Brit. Mus. IV, 1862, p. 38 (partim).
Glyphidodon coelestinus Kner, Novara Exp. Fische I, 1865, p. 244.
Glyphidodon saxatilis Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 524 (partim).
Glyphidodon coelestinus Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 101 (partim).
Glyphidodon coelestinus Günther, Fische der Südsee II, 1881, p. 229.
Abudefduf coelestinus Jordan & Seale, Bull. Bur. Fish. XXV, (1905) 1906, p. 285.
Abudefduf saxatilis M. Weber, Siboga Exp. Fische 1913, p. 345 (partim).
Glyphisodon saxatilis Barnard, Ann. S. Afric. Mus. XXI, 1925—1927, p. 736 (nec L.).
Abudefduf coelestinus Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 83.
Abudefduf sexfasciatus Fowler & Bean, Bull. U. S. Nat. Mus. 100, Vol. VII, 1928, p. 129.
Abudefduf sexfasciatus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 316.
Glyphisodon coelestinus Whitley, Mem. Queensl. Mus. IX, Part III, 1929, p. 240.
Abudefduf sexfasciatus Machan, Ann. Naturh. Mus. Wien XLIV, 1930, p. 440.

D. XIII. 13. A. II. 12—13. P. 2. 17. V. I. 5. Ll. 20 + 3—8.
Ltr. $\begin{array}{c} 3\frac{1}{2} \\ \hline 1 \\ \hline 11 \end{array}$. Sq. l. 28—29.

Height 1.8—1.9, 2.4—2.6 in length with caudal. Head 3.3—3.4, 4.4—4.6 in length with caudal. Length of head 1.3—1.4 in its height. Eye 3.1—3.6, equal to or slightly more than snout and 1.1—1.4 in somewhat convex interorbital space. Mouth oblique. Maxillary reaching to below frontborder of eye or nearly so. Teeth truncate, slightly bifid in young, in a single series. No notch between pre- and suborbital, the edges of which are smooth. Preorbital with one or two rows of deciduous elongate scales, suborbital also scaly. Height of suborbital below middle of eye about one fifth of diameter of eye. $3^1/_2$ transverse rows of scales on preopercle, the inferior and posterior limbs scaly. Scales on upper part of head reaching beyond nostrils and almost to tip of snout, the anterior scales smaller than the others. First dorsal spine less than eye, following spines increasing in length to the fourth, which is as long as snout and half eye together, and subequal to the fifth to seventh spines, the posterior spines slightly shorter. Soft dorsal pointed, the longest rays equal to head without snout. First anal spine less than one third of second, which is slightly longer than longest dorsal spine. Soft anal similar to soft dorsal. Ventrals with the first ray produced, subequal to pectorals, and longer than head. Caudal deeply forked, the lobes pointed. Three or four scales between lateral line and scaly sheath of dorsal below last spine. Colour of preserved specimens bluish grey above, silvery below, the scales with a broader or narrower brownish border. Five blackish transverse bands, as broad as interspaces on back, tapering inferiorly; the first on nape immediately before origin of dorsal, to pectoral axil; the second below 3rd to 6th dorsal spines, downwards to belly, the third from below posterior dorsal spines, ending above origin of anal; the fourth from below posterior dorsal rays, ending above posterior part of anal; the fifth on caudal peduncle at base of caudal. A triangular black spot at base of pectoral superiorly. Spinous dorsal blackish, soft dorsal yellowish or pinkish, the fourth band of the body generally more or less continued on the fin. Anal yellowish or pinkish basally, more or less dusky in its median part. Caudal yellowish or pinkish, each lobe with a median longitudinal black band, which is connected with the transverse band at the base of the fin. Length 167 mm.

Habitat: Sumatra (Padang!); Island Rusa near W. coast of North Sumatra!; Java (Batavia); Celebes (Menado, Palu Bay); Limbe Strait; Buton Strait!; Flores!; Halmahera!; Waigeu!; New Guinea (Manokwari, Atjatuning!, Dörper Spitze). — Coast of Natal, Red Sea, Coasts of British India, Japan, Riu Kiu Islands, Philippines, Coast of Queensland, Pacific Islands, eastwards to Paumotu Islands. In sea, and brackish water.

Note. As several authors, including Bleeker, have united *coelestinus* and *saxatilis*, there are certainly more localities, than mentioned above, where *coelestinus* has been collected.

7. **Abudefduf bankieri** (Rich.)

Glyphisodon bankieri Richardson, Rep. 15th meeting Brit. Ass. Adv. Sc. Rep. Ichth. China. 1846, p. 253.

Glyphisodon nemurus Bleeker, Nat. Tijdschr. Ned. Indië XIII, 1857, p. 73.

Glyphidodon bankieri Günther, Cat. Brit. Mus. IV, 1862, p. 54.

Parapomacentrus Bankieri Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 67. — Atl. Ichth. IX, 1877, Tab. 408, fig. 8.

Chromis xanthurus M. Weber, Siboga Exp. Fische 1913, p. 359 (nec. Blkr.).

Pomacentrus bankieri Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 45.

Abudefduf bankieri Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 181

Abudefduf bankieri Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 326.

Parapomacentrus bankieri Whitley, Mem. Queensl. Mus. IX, Part III, 1929, p. 239.

Pomacentrus bankieri Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 281.

D. XIII. 10—11. A. II. 11. P. 2. 15—16. V. I. 5. Ll. 14—18 + 8—10. Ltr. $\begin{array}{c}2-2\frac{1}{2}\\ \hline 1\\ \hline 8-9\end{array}$. Sq. l. 27.

Height 2.7—2.9, 3.4—3.8 in length with caudal. Head 3.2—3.8, 4.4—4.8 in length with caudal. Length of head 1—1.1 in its height. Eye 3.5—4.2, equal to snout and somewhat less than slightly convex interorbital space. Mouth very oblique. Maxillary not quite reaching to below frontborder of eye. Teeth truncate, in a single series. Preorbital scaleless. Suborbital low, scaled. Two or three transverse rows of scales on preopercle, and one row on inferior limb. Hindborder of preopercle jagged, but not really serrated. Scales on upper part of head reaching to nostrils or nearly so. First dorsal spine as long as one half diameter of eye, following spines increasing in length to the last, which is equal to snout and eye together. Scaly sheath below last dorsal spine separated by one scale and a half from lateral line. Soft dorsal much pointed, the median rays sometimes filamentous and as long as or longer than head. First anal spine less than half length of second, which is as long as last dorsal spine. Soft anal pointed, and with the median rays sometimes filamentous, similar to soft dorsal. Ventrals with the first ray produced, as long as pectorals and as head or somewhat shorter. Caudal forked, the lobes pointed and sometimes filamentous. Colour of preserved specimens brown or bluish grey, sides and lower part of head and body lighter, with a slight silvery hue. A larger or smaller black blotch at origin of lateral line. Pectoral axil black. Generally also a dark stripe along its base. Spinous dorsal and anterior part of soft dorsal, the prolonged rays included, very dark, almost black. Posterior part of soft dorsal white. Other fins white, yellowish or slightly dusky. Length 86 mm.

Habitat: Sumatra (Padang!); Bawean; Talaut Islands!; Buru; Ceram; Ambon; Timor; New Guinea (Port Moresby). — China, Philippines, Solomon Islands, Coast of Queensland. In sea.

8. **Abudefduf anabatoides** (Blkr.)

Glyphisodon anabatoides Bleeker, Verh. Bat. Gen. XXI, 1847. Labr. cten. p. 28.

Glyphidodon anabatoides Günther, Cat. Brit. Mus. IV, 1862, p. 54.

Pomacentrus (Pomacentrus) anabatoides Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 51. — Atl. Ichth. IX, 1877. Tab. 408, fig. 7.
?*Glyphidodon filamentosus* Macleay, Proc. Linn. Soc. New S. Wales VII, 1882, p. 365.
?*Abudefduf metallicus* Jordan & Seale, Bull. Bur. Fish. XXV, (1905) 1906, p. 289.
Abudefduf anabatoides Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 183.
?*Abudefduf filamentosus* Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 323.
Abudefduf anabatoides Fowler, ibid. p. 326.
Pomacentrus anabatoides Fowler, Proc. Acad. Nat. Sc. Philadelphia LXXXVI, 1934, p. 77.
?*Abudefduf metallicus* Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 296.

D. XIII. 10 (11). A. II. 10—11. P. 2. 15. V. I. 5. Ll. 17 + 10.

Ltr. $\begin{array}{c} 1\frac{1}{2}-2 \\ \hline 1 \\ \hline 9 \end{array}$.

Height 2.3, 2.9—3 in length with caudal. Head 3.1—3.7, 4—4.9 in length with caudal. Length of head 1—1.3 in its height. Eye 3—3.1, slightly more than snout and equal to slightly convex interorbital space. Mouth oblique. Maxillary reaching to below front-border of eye. A single row of large, truncate teeth in the jaws and a few much smaller ones behind them at symphysis. A shallow notch between preorbital and suborbital. Preorbital and suborbital with a row of scales. 2—$2^1/_2$ transverse rows of scales on preopercle and a third row on inferior limb. A narrow posterior limb naked. Hindborder of preopercle jagged and with a few microscopical denticulations. Scales on upper part of head reaching to between nostrils. First dorsal spine almost equal to eye, following gradually increasing in length to the last which is as long as postorbital part of head. Soft dorsal much pointed, the median rays may be filamentous and longer than head. First anal spine about one third of second, which is slightly longer than last dorsal spine. Soft anal similar to soft dorsal, the median rays may be filamentous. Ventrals and pectorals subequal, longer than head without snout. Caudal forked, the lobes pointed, and more or less filamentous. Colour of preserved specimens reddish brown, lighter below. Traces of light spots on the scales of body and tail. Axil of pectoral and a blotch superiorly at its base, black. Dorsal and anal dusky. Caudal hyaline, the inferior and superior rays dusky. Pectorals and ventrals yellowish. Length 112 mm.

Habitat: Pulu Weh!; Singapore; Sumatra (Padang!); Java

(Batavia); Bali; New Guinea (Port Moresby). — Philippines, Solomon Islands, Samoa. In sea and fresh water.

Note. The way in which this species has been variously placed in the genera *Pomacentrus* and *Abudefduf* shows how slight the difference is between the two. I have united, although with a query, *Gl. filamentosus* Macleay to the synonymy. The description given by Macleay is very short, but the fin formulae, measurements, the elongate middle rays of soft dorsal and anal, and the filamentous lobes of the caudal, which are black externally, all agree with the characteristics of *anabatoides*. The colour seems however to be darker. Nothing is said about the hindborder of the preopercle. Fowler, l.c., has united *metallicus* and *filamentosus* and probably he is right. This species too has only been briefly described by Jordan & Seale. The preopercle is described as „not toothed". The description given by Herre l.c. is somewhat more elaborate, and there is nothing what is not applicable to *anabatoides*, except the very dark colour. Herre got most of his specimens on the Solomon Islands from fresh water.

9. **Abudefduf curacao** (Bl.)

Chaetodon curacao Bloch, Naturgesch. Ausländ. Fische III, 1787, p. 106.
Glyphisodon curassao Cuvier & Valenciennes, Hist. Nat. Poissons V, 1830, p. 471.
Glyphisodon trifasciatus Bleeker, Verh. Bat. Gen. XXI, 1847. Labr. cten. p. 19.
Glyphisodon ternatensis Bleeker, Nat. Tijdschr. Ned. Indië IV, 1853, p. 137.
Glyphisodon Schlegelii Bleeker, ibid. p. 138.
Glyphidodon schlegelii Günther, Cat. Brit. Mus. IV, 1862, p. 40.
Glyphidodon trifasciatus Günther, ibid. p. 42.
Glyphidodon (Amblyglyphidodon) trifasciatus Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 105. — Atl. Ichth. IX, 1877. Tab. 410, fig. 3.
Glyphidodon (Amblyglyphidodon) ternatensis Bleeker, ibid. p. 106. — ibid. Tab. 404, fig. 1.
Glyphidodon trifasciatus Günther, Fische der Südsee II, 1881, p. 231.
Glyphidodon nigrifrons Macleay, Proc. Linn. Soc. New S. Wales VIII, 1883, p. 271.
Glyphisodon leucogaster Fowler, Journ. Acad. Nat. Sc. Philadelphia (2) XII, Part 4, 1904, p. 535 (nec Blkr.).
Chromis analis Jordan & Seale, Bull. Bur. Fish. XXV, (1905) 1906, p. 292 (nec C. V.).
Abudefduf curaçao Evermann & Seale, Bull. Bur. Fish. XXVI, (1906) 1907, p. 93.
Glyphisodon nigrifrons McCulloch, Rec. Austr. Mus. XI, N⁰ 7, 1917, p. 182.
Abudefduf philippinus Fowler, Proc. Acad. Nat. Sc. Philadelphia LXX, 1918, p. 54.

Abudefduf curacao Fowler & Bean, Proc. U. S. Nat. Mus LXII, 1922, Art. 2, p. 48. — Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 138.
Abudefduf curaçao Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 85.
Abudefduf curacao Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 318.
Amblyglyphidodon curacao Whitley, Mem. Queensl. Mus. IX, Part III, 1929, p. 241.
Abudefduf ternatensis Giltay, Mem. Mus. Royal Hist. Nat. V, 1933, p. 75.
Abudefduf curacao Fowler, Mem. B. P. Bishop Mus. XI, N⁰ 6, 1934, p. 435.
Abudefduf curaçao Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 293.

D. XIII. 11—12. 1) A. II. 12—13. P. 2. 15. V. I. 5. Ll. 16—17 + 8. Ltr. $\begin{array}{c}2\\\hline 1\\\hline 10\end{array}$. Sq. l. 25—27.

Height 1.6—1.8, 2.1—2.3 in length with caudal. Head 3.2—3.6, 4.2—4.8 in length with caudal. Length of head 1.3—1.6 in its height. Eye 2.6—2.9, somewhat longer than snout and 1—1.1 in the somewhat convex interorbital space. Mouth oblique. Maxillary reaching to below frontborder of eye in young, not so far in adults. Teeth truncate, in a single series. Preorbital notched, suborbital narrow, both bones with a row of deciduous scales. Two transverse rows of scales on preopercle and a third on inferior limb. A very narrow posterior limb naked. Scales on upper part of head reaching to upper lip, the anterior scales smaller than the others. First dorsal spine less than eye, half length of second. Following spines increasing in length to the 7th or 8th, which are equal to snout and eye together or somewhat longer. Posterior spines gradually decreasing in size, but the last one equal to or somewhat longer than the penultimate one. Scaly sheath below last spine separated by 1½—2 scales from lateral line. Soft dorsal high and pointed, the longest median rays as long as or longer than head. First anal spine as long as first dorsal one, second anal spine very strong and long, equal to head without snout or somewhat longer. Soft anal more rounded and less deep than soft dorsal, the longest rays equal to head without snout or somewhat longer. Pectorals equal to head or longer. Ventrals with the first ray produced, reaching on anal and longer than pectorals. Caudal forked. Colour of preserved specimens reddish grey above, more silvery below. A variable number of scales on back, and sides of body and tail, with large black blotches sometimes forming three transverse bands on body, tapering below, the first and second below the spinous dorsal,

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1) In one specimen I find D. XII. 12 and Fowler & Bean record a specimen with XIV dorsal spines.

and the third below the soft portion of the fin. A fourth may be present on caudal peduncle. Sometimes the back and the sides are completely black, in other cases there are only a few scales with black spots, and the bands are hardly indicated. Spinous dorsal and anterior rays of soft dorsal black or brown, rest of fin yellowish. Anal blackish or brownish, except the distal part of the posterior rays. Caudal yellowish, the upper and lower rays more or less dusky. Pectorals and ventrals hyaline, or the ventrals with a dusky hue. Length 125 mm.

Nom. indig. Betok laut, Gemutu (Malay, Batavia).

Habitat: Sumatra (Padang!); Batu Islands; Nias; Java (Batavia!); Duizend Islands!; Celebes (Makassar, Menado, Gulf of Boni, Libani Bay); Halmahera; Ternate; Doworra Island; Ceram; Ambon; Goram; Flores; Timor!; Southeastern Coast of New Guinea, Island Weeim, North of Misol. — Riu Kiu Islands, Philippines, Carolines, Marshall Islands, Admirality Islands, New Britain, Solomon Islands, New Hebrides, Coast of Queensland, Fiji, Samoa. In sea.

Note. I have united *Gl. ternatensis* Blkr. with this species. According to Bleeker *ternatensis* differs from *curacao* in having D. XIII. 10—12, P. 2. 13—14, and the teeth of the upper pharyngeals, which are partly obtuse in *curacao*, are all pointed in *ternatensis*. Furthermore *ternatensis* has the body slightly more slender.

10. **Abudefduf leucogaster** (Blkr.)

Glyphisodon leucogaster Bleeker, Verh. Bat. Gen. XXI, 1847, Labr. cten. p. 26.

Glyphisodon leucogaster Günther, Cat. Brit. Mus. IV, 1862, p. 46.

Glyphidodon leucogaster Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 523.

Glyphidodon leucogaster Day, Fishes of India, Part III, 1877, p. 388.

Glyphidodon (*Amblyglyphidodon*) *leucogaster* Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 108. — Atl. Ichth. IX, 1877, Tab. 407, fig. 6.

Abudefduf leucogaster M. Weber, Siboga Exp. Fische 1913, p. 348.

Abudefduf leucogaster Fowler & Bean, Proc. U. S. Nat Mus. LXII, 1922, Art 2, p. 48. — Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 171.

Abudefduf leucogaster Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 88.

Abudefduf leucogaster P. J. Schmidt, Trans. Pac. Comm. Acad. Sc. USSR. I, 1930, p. 69.

D. XIII. 11—12 (13). A. II. 13—14. P. 2. 15. V. I. 5. Ll. 16 + 8—9. Ltr. $\begin{array}{c} 2\text{—}3 \\ \hline 1 \\ \hline 10 \end{array}$. Sq. l. 26.

Height 1.6, 2—2.1 in length with caudal. Head 3.4—3.6, 4.4—4.5 in length with caudal. Length of head 1.7—1.8 in its height. Eye 2.5—3, more than snout and 1.1—1.2 in convex interorbital space. Mouth very oblique. Maxillary reaching to below frontborder of eye. Teeth truncate, in a single series. Preorbital notched, suborbital narrow, both bones with a row of scales. Two transverse rows of scales on preopercle and a third row consisting of more deciduous ones on inferior limb. A narrow posterior limb with some deciduous scales. Scales on upper part of head reaching to upper lip, the anterior scales smaller than the posterior ones. First dorsal spine less than eye, second more than double as long as first, third to eighth subequal, as long as head without snout, the following ones slightly shorter. Last spine separated by 1—1½ scales from lateral line, the scales of the dorsal sheath not counted. Soft dorsal high and pointed, the longest rays as long as head without snout or somewhat longer. First anal spine as long as first dorsal spine or somewhat longer; second anal spine long and strong, equal to head without snout or longer. Soft anal similar to soft dorsal. Pectorals almost one eye diameter longer than head. Ventrals with the first ray produced and reaching on anal, longer than pectorals. Caudal forked. Colour of preserved specimens olive, and more or less silvery below, the scales of back and sides with a broad dark brown subterminal and a narrow light terminal border. Dorsal and anal dark brown, the posterior half of the soft dorsal and anal creamy. Caudal creamy, the upper and lower borders brown. Pectorals and ventrals greyish. A triangular black blotch at base of pectoral superiorly. Length 135 mm 1).

Nomen indig. Betok laut (Malay, Batavia). Sajang-sajang (Ambon).

Habitat: Pulu Weh!; Java (Batavia!); Duizend Islands; Celebes (Gulf of Boni, Libani Bay, Gulf of Tomini); Sulu Islands; Buru; Ceram; Ambon!; Tidore; Doworra Island; Banda!; Timor. — Zanzibar, Red Sea, Coasts of British India, Nicobars, Indochina, Riu Kiu Islands, Philippines, Solomon Islands, Coast of Queensland, New Caledonia, Fiji, Society Islands. In sea.

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1) M. Weber, l.c., records a specimen of 156 mm length. This is a misprint. The two specimens of the Siboga Expedition measure 103 and 120 mm.

Note. This species is close to *curacao*, but may be distinguished by its shorter snout, the profile of which is convex, by the mouth being more oblique, by the dark blotch at axil of pectoral, and by the absence of transverse bands. I do not find difference in the length of the second anal spine, as mentioned by Bleeker. I compared specimens of both species from Bleeker's collection in the Amsterdam Museum.

11. **Abudefduf aureus** (C. V.)

Glyphisodon aureus Cuvier & Valenciennes, Hist. Nat. Poissons V, 1830, p. 472.
Glyphisodon aureus Schlegel & Müller, Verh. nat. gesch. Ned. overz. Bezitt. Zool. 1839—1841. Overzigt Amphiprion etc. p. 22.
Glyphisodon aureus Bleeker, Verh. Bat. Gen. XXI, 1847, Labr. cten. p. 21.
Glyphidodon aureus Günther, Cat. Brit. Mus. IV, 1862, p. 45.
Glyphidodon (*Amblyglyphidodon*) *aureus* Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 109. — Atl. Ichth. IX, 1877. Tab. 405, fig. 4.
Abudefduf aureus Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 87.
Abudefduf aureus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 142.

D. XIII. 11—13. A. II. 14. P. 2. 15. V. I. 5. Ll. 15—17 + 6—8. Ltr. $\frac{2}{\frac{1}{10}}$. Sq. l. 25—26.

Height 1.6—1.7, 2.3—2.4 in length with caudal. Head 3.2—3.3, 4.4—4.7 in length with caudal. Length of head 1.4—1.5 in its height. Eye 2.6—3.1, equal to or longer than snout and 1—1.2 in somewhat convex interorbital space. Mouth oblique. Maxillary reaching quite or almost to below frontborder of eye. Teeth truncate, in a single series. Preorbital notched, suborbital narrow, both bones with a row of deciduous scales. Two transverse rows of scales on preopercle, and a third on inferior limb, the posterior limb narrowly naked superiorly, inferiorly with a few deciduous scales. Scales on upper part of head reaching beyond nostrils, the anterior ones smaller than the others. First dorsal spine less than eye, second double as long as first, and about two thirds of third. Following spines slightly increasing in length to the last, which is half length of snout shorter than head or equal to head without snout. Soft dorsal very high and pointed, the longest ray about equal to distance between corner of mouth and base of ventral. Anal spines strong, the first as long as eye, the second as long as head or nearly so. Pectorals as long as head or somewhat longer. Ventrals with the first ray produced, reaching to anal, as long as or somewhat longer than pectorals. Caudal deeply forked, the lobes pointed. One scale and a half between lateral line and scaly sheath of dorsal below last spine. Colour of preserved specimens uniform yellowish. Length 165 mm.

Nomen indig. Betok laut kuning (Malay, Batavia).

Habitat: Strait Malacca, Northwest of Aru Bay, Sumatra!; Java (Batavia!); Celebes (Makassar, Menado, Cape Kait, Limbe Strait, Gulf of Boni, Gulf of Tomini); Sulu Islands; Gomomo Island; Doworra Island; Makian; Tidore; Ambon; Banda!. — Philippines. In sea.

12. **Abudefduf filifer** M. Web. (Fig. 50, p. 419)

Abudefduf filifer M. Weber, Siboga Exp. Fische 1913, p. 348.

Height 1.7, head 3.5. Eye 3, equal to snout. Scales on upper part of head almost reaching to end of snout. Preorbital partly scaled. Suborbital with one row of scales, its lower border free. Two transverse rows of scales on preopercle, and one on inferior limb. Posterior limb scaleless. Dorsal spines increasing in length posteriorly, the last one equal to snout and eye together. Membranes between the spines deeply incised and lobated. Second anal spine scarcely more than postorbital part of head. Soft dorsal and anal pointed. First ray of ventrals produced, reaching on anal. Caudal forked, the upper lobe with a filament, not shown in the figure. Colour of preserved

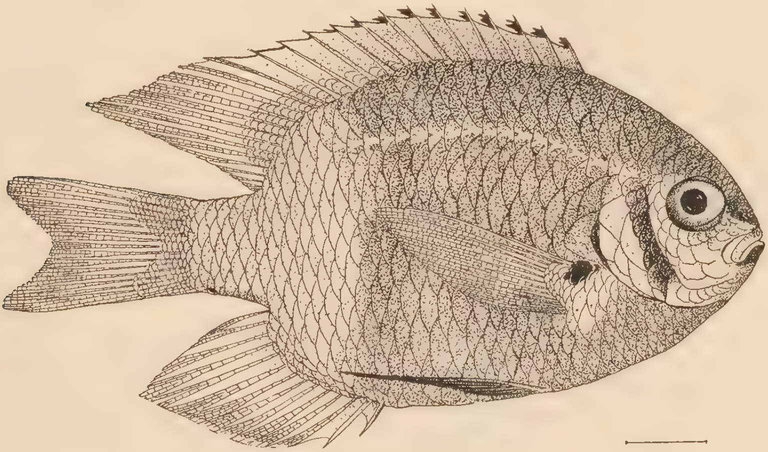

Fig. 50. *Abudefduf filifer* M. Web. n.s.

specimen olive brown, fading into yellowish posteriorly. Caudal, soft dorsal, and soft anal yellowish, the anal with a narrow dark edge. Spinous dorsal with a black edge. Ventrals black. Pectorals hyaline. A black blotch superiorly at its base. A transverse blackish band behind hindborder of preopercle. Length 62 mm.

Habitat: Kei Islands!. In sea, on reefs.

13. **Abudefduf thoracotaeniatus** Fowler & Bean

Abudefduf thoracotaeniatus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 159.
Glyphidodontops thoracotaeniatus Roxas & Martin, Techn. Bull. Bur. Sc. Manila VI, 1937, p. 192.

D. XIII. 13—14. A. II. 12—13. Ll. 12—16 + 8—10. Ltr. $\begin{array}{c}3\\ \hline 1\\ \hline 7\end{array}$. Sq. l. about 27.

Height $1^{7}/_{8}$—$1^{9}/_{10}$. Head $3^{1}/_{8}$—$3^{1}/_{4}$. Eye $2^{1}/_{3}$—$2^{2}/_{3}$, more than snout and about equal to convex interorbital space. Mouth oblique. Maxillary extending slightly beyond front eye edge. Teeth compressed, uniserial, subtruncate. Suborbital and preopercle edges entire. Suborbital with a row of scales. Two transverse rows of scales on preopercle and one on inferior limb. Scales on upper part of head reaching to nostrils. Dorsal spines slightly increasing in length to the last, which goes 1.6—2 in head. Soft dorsal pointed, the longest rays about equal to head. Second anal spine 2—$2^{1}/_{8}$ in head. Soft anal obtusely pointed, fifth ray 1—1.1 in head. Pectorals longer than head, ventrals with the first ray produced, still longer. Caudal slightly forked, the lobes rounded. Deep chocolate brown or sienna. On head and thorax 3 transverse broad bands of same colour, leaving intermediate cream white bands, so that third dark band not meeting its fellow or even reaching ventral axil. Pectoral base black. Vertical fins all dark or dusky. Pectorals pale. Ventrals whitish, with membranes brownish terminally. Length 103 mm (After Fowler & Bean, not seen by me).

Habitat: Talisse Island; Togian Islands; Buka Buka Island: Halmahera; Makian; Doworra Island. — Philippines. In sea.

14. **Abudefduf bonang** (Blkr.)

Glyphisodon bonang Bleeker, Nat. Tijdschr. Ned. Indië III, 1852, p. 582.
Glyphidodon bonang Günther, Cat. Brit. Mus. IV, 1862, p. 45.
Paraglyphidodon bonang Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 118. — Atl. Ichth. IX, 1877. Tab. 403, fig. 1.

Chrysiptera bonang Franz, Abh. Bayer. Akad. Wiss. 1910, p. 51.
Abudefduf bonang Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 154.
Abudefduf bonang Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 320.

D. XIII. 15—16 (17). A. II. 13—15. P. 2. 16—18. V. I. 5. Ll. 20 + 7—9. Ltr. $\dfrac{2\frac{1}{2}-3}{\dfrac{1}{12}}$. Sq. l. 27—28.

Height 1.6—1.8, 2.1—2.4 in length with caudal. Head 3.1—3.2, 3.9—4.1 in length with caudal. Length of head 1.3 in its height. Profile of head convex. Eye 3—3.2, about equal to snout and 1—1.1 in slightly convex interorbital space. Mouth slightly oblique. Maxillary reaching to below frontborder of eye. Teeth rounded, almost pointed at tip, in two rows, the teeth of the inner row shorter and more slender. Preorbital rather deep; a shallow notch between it and the suborbital. Posterior part of preorbital, and suborbital, scaly. Three or four transverse rows of scales on preopercle and another row on inferior limb. Posterior limb narrowly naked. Scales on upper part of head reaching to nostrils. First dorsal spine more than half length of second; following spines gently increasing in length to the seventh, which equals snout and eye together. Posterior spines decreasing again in length. $1^{1}/_{2}$ or 2 scales between lateral line and scaly sheath of dorsal below last spine. Soft dorsal rounded, the median rays longest and equal to head without snout. First anal spine less than half length of second. Ventrals, with the first ray produced into a long filament, longer than head. Pectorals rounded, slightly shorter than head. Caudal emarginate. Colour of preserved specimens brown, many scales with a lighter spot. A light bluish stripe connecting nostrils over snout. A large dark brown white edged ocellus between the 9th to 11th dorsal spines and lateral line. According to Bleeker this ocellus may disappear in large specimens. A brown spot at axil of pectoral and a less distinct one at base of last dorsal rays. Fins brown, darker at edge of spinous dorsal. Length 150 mm.

Habitat: Sumatra (Padang, Siboga); Java (Karangbollong); Strait Madura!; North Celebes; Tidore. — Travancore, Japan, Philippines, Samoa. In sea.

Note. Fowler & Bean, l.c., find only 10—13 rays in the dorsal, but my specimens agree with those of Bleeker in having 15—16 rays.

15. **Abudefduf melanopus** (Blkr.)

Glyphisodon melanopus Bleeker, Nat. Tijdschr. Ned. Indië XI, 1856, p. 82.
Glyphidodon melanopus Günther, Cat. Brit. Mus. IV, 1862, p. 48.
Paraglyphidodon melanopus Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 119. — Atl. Ichth. IX, 1877. Tab. 407, fig. 7.

D. XIII. 13—14. A. II. 13—14. P. 2. 15—16. V. I. 5. Sq. l. 28.
Ltr. $\begin{array}{c}4\\ \hline 1\\ \hline 9\end{array}$.

Height almost 2, 2.4—2.6 in length with caudal. Head 3.6—4, Eye 2.5. Scales on head reaching to between nostrils. Suborbital scaly. Depth of preorbital less than half diameter of eye. Snout half diameter of eye. Maxillary reaching to below anterior part of eye. Teeth very slender, in two rows, those of the inner row scarcely shorter than those of the outer row. Two transverse rows of scales on preopercle and a third on inferior limb. Dorsal spines slightly increasing in length to the 9th or 10th. $1^1/_2$ or 2 scales between lateral line and scaly sheath of dorsal below last spine. Soft dorsal much higher than spinous part, acutely rounded. Second anal spine much longer than postorbital part of head. Soft anal somewhat less deep but otherwise similar to soft dorsal. Pectorals scarcely longer than head. Ventrals with the first ray produced, conspicuously longer than head. Caudal emarginate, the lobes pointed. Colour yellowish. Many scales of body with a bluish spot. Vertical fins darker at base. Anterior part of anal and ventrals black. Length 56 mm (After Bleeker, not seen by me).

Habitat: Java (South eastern Coast); Timor. — Zanzibar, Queensland. In sea.

16. **Abudefduf behni** (Blkr.)

Glyphisodon Behnii Bleeker, Verh. Bat. Gen. XXI, 1847, Labr. cten. p. 25.
Glyphisodon xanthurus Bleeker, Nat. Tijdschr. Ned. Indië V, 1853, p. 345.
Glyphidodon xanthurus Günther, Cat. Brit. Mus. IV, 1862, p. 47.
Glyphidodon behni Günther, ibid. p. 48.
Paraglyphidodon Behnii Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 121. — Atl. Ichth. IX, 1877, Tab. 405, fig. 7.
Paraglyphidodon xanthurus Bleeker, ibid. p. 122. — ibid. Tab. 405, fig. 3.
Chrysiptera xanthura Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 96.
Abudefduf xanthurus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 155.

D. XIII. 14—15 1). A. II. 13 (14). P. 2. 14—15. V. I. 5. Ll. 17 + 10. Ltr. $\begin{array}{c}3\\\hline 1\\\hline 9\end{array}$. Sq. l. 27.

Height 1.8—1.9, 2.4—2.6 in length with caudal. Head 3.3—3.6, 4.6—4.7 in length with caudal. Length of head 1.1—1.3 in its height. Eye 3.1—3.7, about as long as snout and 1.2—1.5 in somewhat convex interorbital space. Mouth somewhat oblique. Maxillary reaching scarcely beyond vertical through nostril. Teeth with the cutting edge rounded, in two series. The teeth of the inner row shorter than those of the outer row. Preorbital notched, deeper than suborbital. Both bones with one row of deciduous scales. Two transverse rows of scales on preopercle and a third row on inferior limb. Posterior limb naked. Scales on upper part of head reaching to or beyond nostrils. Dorsal spines increasing in length posteriorly, the first equal to eye, the last to head without snout. The membranes between the spines incised. $1^{1}/_{2}$ to 2 scales between lateral line and scaly sheath of dorsal below last spine. Soft dorsal pointed, the longest rays as long as head. First anal spine less than half length of second, which nearly equals the head without snout. Soft anal less pointed and less deep than soft dorsal. Pectorals as long as head. Ventrals with the first ray produced into a thread-like filament, reaching on anal, and longer than pectorals. Caudal forked, the lobes pointed. Colour of preserved specimens lighter or darker brown. Caudal peduncle and caudal sometimes lighter, the other fins darker, especially the ventrals. Opercle with a dark posterior edge, and a dark band anteriorly, immediately behind posterior preopercular border. A dark brown triangular spot at base of pectoral superiorly. Length 151 mm.

Habitat: Java (Batavia!); Duizend Islands!; Celebes (Gulf of Boni, Gulf of Tomini); Sangi Islands; Sulu Islands; Halmahera; Doworra Island; Tidore; Flores; Buru; Ceram; Obi; Ambon; Banda; New Guinea! — Formosa, Philippines, Solomon Islands. In sea.

Note. Among my material I find specimens which in some points more agree with *behni* and with *xanthurus* in other points. The colour varies from light brown to dark brown, the posterior part of the soft dorsal and anal may be lighter or darker, the scales on head reach to nostrils or almost to end of snout, and the second

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In one specimen I find D. XII. 14.

anal spine may be half or one fourth diameter of eye shorter than head without snout, but these characters do not occur in a combination which makes it possible to separate them in groups agreeing with *behni* and *xanthurus*. I therefore unite the two species.

17. **Abudefduf melas** (C. V.)

Glyphisodon melas Cuvier & Valenciennes, Hist. Nat. Poissons V, 1830, p. 472.
Glyphisodon ater Cuvier & Valenciennes, ibid. p. 473.
Glyphisodon melas Schlegel & Müller, Verh. nat. gesch. Ned. overz. Bezitt. Zool. 1839—1841. Overzigt Amphiprion etc. p. 23.
Glyphisodon melas Bleeker, Verh. Bat. Gen. XXI, 1847. Labr. cten. p. 23.
Glyphidodon melas Günther, Cat. Brit. Mus. IV, 1862, p. 45. — Fishes of Zanzibar, 1866, p. 83.
Glyphidodon melas Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 526.
Paraglyphidodon melas Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 123. — Atl. Ichth. IX, 1877, Tab. 404, fig. 4.
Glyphidodon melas Day, Fishes of India. Suppl. 1888, p. 801.
Glyphidodon (*Paraglyphidodon*) *melas* Steindachner, Denkschr. Akad. Wien LXX, 1900, p. 502.
Abudefduf plagiometopon De Beaufort, Bijdr. Dierk. Afl. 19. 1913, p. 128 (nec Blkr).
Chrysiptera melas Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 95.
Glyphisodon (*Paraglyphidodon*) *melas* Whitley, Rec. Austr. Mus. XVI, N⁰ 1, 1927, p. 21.
Abudefduf melas Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 161.
Abudefduf melas Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 320.
Paraglyphisodon melas Whitley, Mem. Queensl. Mus. IX, Part III, 1929, p. 241.
Abudefduf melas Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 296.

D. XIII. 14. A. II. 13 (14). P. 2. 16. V. I. 5. Ll. 17 + 8—9.

Ltr. $\begin{array}{c}2\frac{1}{2}-3\\ \hline 1\\ \hline 10-11\end{array}$. Sq. l. 26—28.

Height 1.8, 2.2—2.3 in length with caudal. Head 3.2—3.4, 4—4.3 in length with caudal. Length of head 1.2—1.3 in its height. Eye 4—4.1, 1.2 in snout and 1.7—1.8 in convex interorbital space. Mouth somewhat oblique. Maxillary reaching beyond vertical through nostril but not to below frontborder of eye. Teeth with rounded cutting edges, in two rows, those of the inner row much more slender than those of the outer row. Preorbital scarcely notched, not much deeper than suborbital. Both bones with a row of scales. Three or four transverse rows of scales on preopercle and one row on inferior limb. The posterior limb is scaled or very narrowly naked. Scales on upper part of head reaching beyond nostrils, sometimes to end of snout. First dorsal spine less than eye, following increasing gradually in size to about the sixth, following spines subequal but the last ones slightly longer again, the last spine equal to snout and eye together. $1^1/_2$ to 2 scales between lateral line and scaly sheath or dorsal below last spine. Soft dorsal rounded, the longest rays slightly more than head without snout. First anal spine less than one third of second, which is half diameter of eye longer than postorbital part of head. Soft anal rounded, the longest rays about equal to snout and eye together. Ventrals with the first ray slightly prolonged, reaching to anal or not, subequal to pectorals, and about as long as head. Caudal scarcely emarginate, the lobes rounded. Colour of preserved specimens, the fins included, dark brown or violet. Length 172 mm.

Nomen indig. Betok laut hitam (Malay, Batavia).

Habitat: Singapore; Sumatra (Padang!); Nias; Java (Batavia!); Celebes (Makassar, Gulf of Boni, Menado, Limbe Strait); Sulu Islands; Maitara; Tidore; Gomomo Island; Batjan; Buru; Ceram; Ambon; Solor; Waigeu!. — Madagascar, Zanzibar, Aden, Burma, Riu Kiu Islands, Formosa, Philippines, Pelew Islands, Solomon Islands, New Hebrides, Queensland, Fiji, Hawaii, Marquesas Islands. In sea.

18. **Abudefduf azysron** (Blkr.)

Pomacentrus (*Pomacentrus*) *azysron* Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 50. — Atl. Ichth. IX, 1877, Tab. 410, fig. 1.
Abudefduf azysron Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 181.

D. XIII. 12—13. A. II. 11—12. P. 2.17. V. I. 5. Sq. l. 28. Ltr. $\begin{array}{c}3-3\frac{1}{2}.\\ \hline 1\\ \hline 9\end{array}$

Height 2.5, 3.2 in length with caudal. Head 4.2. Eye 3.1, twice in snout. Scales on upper part of head reaching to between nostrils. Preorbital and suborbital scaly. Mouth oblique. Maxillary reaching to below frontborder of eye. Teeth in two rows. Three transverse rows of scales on preopercle and a fourth on inferior limb. Posterior limb scaly. Ninth and tenth dorsal spines somewhat longer than the others, about equal to snout and eye together. Soft dorsal somewhat pointed, the longest rays about equal to head without snout. Second anal spine somewhat longer than dorsal spines. Soft anal similar to soft dorsal. Ventrals with the first ray produced, subequal to pectorals, and nearly as long as head. Caudal deeply emarginate, the lobes pointed. Dark brown, scales with or without light transverse spots. Base of pectorals dark. Caudal and sometimes also greater part of caudal peduncle yellowish. Dorsal dark, but posterior half of its soft part yellowish. Ventrals and pectorals pale brown. Length 81 mm (Compiled, not seen by me).

Habitat: Ambon. — Philippines. In sea.

19. **Abudefduf oxycephalus** (Blkr.)

Paraglyphidodon oxycephalus Bleeker, Versl. Akad. Amsterdam (2) X, 1877, p. 399. — Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 125. — Atl. Ichth. IX, 1877, Tab. 409, fig. 4.

D. XIII. 12. A. II. 12—13. P. 2. 14—15. V. I. 5. Sq. l. 28. Ltr. $\begin{array}{c}3\\ \hline 1\\ \hline 9\end{array}$.

Height about 2, 2.7 in length with caudal. Head about 4. Eye 2.5. Scales on upper part of head reaching to between nostrils. Suborbital without scales. Preorbital scaly, but figured without scales. Depth of preorbital less than half diameter of eye, and more than that of suborbital. Snout about half length of eye. Mouth oblique. Maxillary reaching below frontborder of eye. Lower jaw scaly. Teeth in two rows, those of the outer row truncate, those of the inner row much more slender but not shorter. Posterior preopercular limb scaleless, inferior limb scaly. Two transverse rows of scales on preopercle. Dorsal spines slightly increasing in length posteriorly; the membranes between the spines incised. Soft dorsal higher than spinous part, acutely rounded. Second anal spine much shorter than head without snout. Soft anal similar to soft dorsal. Pectorals as long as head or slightly shorter. Ventrals with the first ray produced, longer than head or slightly shorter. Ventrals with the first ray produced, longer than head. Caudal deeply emarginate. Colour yellowish. Length 60 mm (After Bleeker, not seen by me).

Habitat: Buru; Timor.

Note. Bleeker described this species after 4 small specimens. It has never been found since.

20. **Abudefduf xanthonotus** (Blkr.)

Glyphisodon xanthonotus Bleeker, Nat. Tijdschr. Ned. Indië XVIII, 1859, p. 357.
Paraglyphidodon xanthonotus Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 126. — Atl. Ichth. IX, 1877. Tab. 404, fig. 2.

Chrysiptera xanthonotus Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 97.

Abudefduf xanthonotus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 159.

D. XIII. 13—14 (15). A. II. 13 (14). P. 2. 16. V. I. 5. Ll. 15—17 + 8. Ltr. $\begin{array}{c}3\text{—}4\\ \hline 1\\ \hline 9\text{—}10\end{array}$. Sq. l. 24—28.

Height 1.7—1.8, head 2.9—3.2. Eye 2.4—2.7, longer than snout and than slightly convex interorbital space. Mouth oblique. Maxillary reaching to below frontborder of eye. Teeth in two rows, those of the inner row shorter. Scales on upper part of head reaching to end of snout. Preorbital without notch. Suborbital without scales, rugose, according to Bleeker, but according to Fowler & Bean the preorbital and the suborbital have a row of scales. Three transverse rows of scales on preopercle and one on inferior limb. Dorsal spines slightly increasing in size posteriorly. Soft dorsal higher than spinous part, acutely rounded. Second anal spine scarcely shorter than head without snout. Soft anal obtusely rounded, less deep than soft dorsal. Pectorals and ventrals subequal, longer than head. Caudal emarginate. In life upper part and sides of head, back, greater part of dorsal, posterior part of anal and upper and lower rays of caudal yellow, lower side of head, sides, tail, median caudal rays, posterior half of soft dorsal, pectorals, and anterior rays of ventrals dark violet. Anterior half of anal blackish. In preserved specimens the colour is uniform dull brown, anal blackish anteriorly, light posteriorly, upper and lower margin of caudal pale. Length 80 mm (Compiled, not seen by me).

Habitat: Bawean. — Philippines.

Note. Bleeker described this species in 1859 after a single specimen, which he redescribed again in 1877. It was then in rather bad condition, and hence he was unable to ascertain the number of rows of scales on the preopercle, which he supposed to be two. Since then Montalban, Fowler & Bean, and Herre discovered this species in the Philippines and were able to give a better description. According to them the preorbital and the suborbital are scaled and there are three rows of scales on the preopercle. It seems to be a rare species living in a peculiar biotope, as only 5 specimens in all have been collected.

21. **Abudefduf oxyodon** (Blkr.)

Glyphisodon oxyodon Bleeker, Acta Soc. Sc. Indo-Neerl. III, 1858. Tiende bijdr. vischf. Celebes. p. 14.
Glyphidodon oxyodon Günther, Cat. Brit. Mus. IV, 1862, p. 44.
Paraglyphidodon oxyodon Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 127. — Atl. Ichth. IX, 1877. Tab. 404, fig. 2.
Chrysiptera oxyodon Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 98.
Abudefduf oxyodon Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 164.

D. XIII. 12—14. A. II. 12—14. P. 2. 14—15. V. I. 5. Sq. l. 25—28. Ltr. $\frac{3-4}{\frac{1}{10}}$.

Height 1.9—2. Head 2.8—3.1. Eye 3—3.4, more than snout and equal to slightly convex interorbital space. Scales on upper part of head reaching to between nostrils. Mouth oblique. Maxillary reaching to below frontborder of eye. Teeth uniserial at symphysis, biserial in the sides of the jaws; those of the outer row slender, compressed, pointed, and longer than those of the inner row. Preorbital, suborbital, inferior and posterior preopercular limb naked. Three transverse rows of scales on preopercle. Dorsal spines slightly increasing in size to the last. Membranes between the spines not incised. Second anal spine shorter than head without snout. Soft dorsal and anal rounded. Pectorals slightly shorter than head, ventrals pointed, as long as head. Caudal slightly emarginate. Colour of preserved specimens deep brown, fins dusky to blackish. A light blue band extends from snout tip, including upper rim of eye and then back above suprascapular and close along and above lateral line, for 3 scales of its course, or further backwards to below spinous dorsal. Below and parallel to it a similar band from corner of mouth to lower part of opercle. Another oblique band, parallel to the others, from origin of soft dorsal to below lateral line. A fourth band from caudal peduncle immediately behind dorsal, parallel to the third, sometimes only developed as a light spot behind dorsal. A large, light blotch or transverse band on the sides may be present. Length 111 mm (Compiled, not seen by me).

Habitat: Bawean; Celebes (Menado); Sulu Islands. — Philippines. In sea, on coral reefs.

22. **Abudefduf plagiometopon** (Blkr.)

Glyphisodon plagiometopon Bleeker, Nat. Tijdschr. Ned. Indië III, 1852, p. 67.
Glyphidodon plagiometopon Günther, Cat. Brit. Mus. IV, 1862, p. 51.

Glyphidodon (*Hemiglyphidodon*) *plagiometopon* Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 103. — Atl. Ichth. IX, 1877, Tab. 410, fig. 4.

Abudefduf melanopselion Fowler, Proc. Acad. Nat. Sc. Philadelphia LXX, 1918, p. 59.

Abudefduf melanopselion Fowler & Bean, Proc. U. S. Nat. Mus. LXII, Art. 2, 1922, p. 49.

Hemiglyphidodon plagiometopon Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 75.

Hemiglyphidodon plagiometopon Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 185.

Hemiglyphidodon plagiometopon Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 326.

Hemiglyphidodon plagiometopon Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 302.

D. XIII. 12—14 (15). A. II. 13—15 (16). P. 2.15. V. I. 5. Sq. l. 25—28. Ll. 14—18 + 5—10. Ltr. $\begin{array}{c}4-5\\\hline 1\\\hline 9-10\end{array}$.

Height 1.9—2. Head 2.7—3.1. Eye 3.3—4.1, somewhat more or less than snout and less than very convex interorbital space. Scales on upper part of head reaching to between nostrils. Mouth oblique. Maxillary not reaching to below frontborder of eye in adults. Teeth truncate, in a single row. Gillrakers very long, and numerous, about 30—35 + 38—48 on the first arch. Two transverse rows of scales on preopercle, and one on inferior limb. Posterior limb, preorbital, and suborbital naked, but lastnamed bone rugose and with the lower border rough in adults. Dorsal spines strong, increasing in length posteriorly, the last one 1.7—2 in head. Soft dorsal higher than spinous part, obtusely rounded. Second anal spine equal to or slightly less than head without snout. Soft anal similar to soft dorsal. Pectorals scarcely shorter than head. Ventrals pointed, as long as head. Caudal scarcely emarginate, almost truncate. Colour of preserved specimens more or less uniform dark to light brown. In young with pale blue lines and spots on head, thorax and bases of dorsal and anal, disappearing with age. A dark blotch at base of pectoral may be present. Fins dusky brown, darker with age. Length 187 mm. (Compiled, not seen by me).

Nomen indig. Rodu (Port Moresby).

Habitat: Singapore; Java (Batavia); Celebes (Gulf of Boni, Gulf of Tomini); Sulu Islands; Halmahera; Danawan Island; Gomomo Island; Ambon; New Guinea (Port Moresby). — Mauritius, China, Philippines, Solomon Islands, Samoa. In sea.

Note. Montalban and Fowler & Bean have pointed out that this species is characterized by the length and the great number of gillrakers. what has been overlooked by Bleeker. Dr. Koumans kindly informs me, that the types in the Leiden Museum agree in this respect with the specimens described by Montalban and Fowler & Bean. I do not think it necessary to separate this species on account of this pecularity from the other members of the genus *Abudefduf*; as has been done by several authors. It is well known that the number of gillrakers may show great differences in closely related species, f.i. in the Allice Shad and the Twaite Shad.

23. **Abudefduf hemicyaneus** M. Web.

Glyphidodon cyaneus Bleeker, Ned. Tijdschr. Dierk. I, 1863, p. 273 (nec Q. G.).
Glyphidodontops cyaneus Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 130. — Atl. Ichth. IX, 1877, Tab. 409, fig. 2 (nec Q. G.).
Abudefduf hemicyaneus M. Weber, Siboga Exp. Fische 1913, p. 351.
Abudefduf parasema Fowler, Proc. Acad. Nat. Sc. Philadelphia LXX, 1918, p. 56.
Chrysiptera parasema Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 100.
Abudefduf sapphirus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 175 (nec Jord. & Rich.).

D. XIII. 12. A. II. 12. Sq. l. 29. Ltr. $\frac{3}{\frac{1}{10}}$.

Height a little more than 2.5 in total length. Head 4 in total length. Eye 2.3. Snout shorter than eye. Preorbital and suborbital without scales. No notch between the two bones. Two transverse rows of scales on preopercle, and one row on inferior limb. Posterior limb broadly naked. Teeth in two rows, the anterior row consisting of compressed teeth, bluntly rounded at tip; those of the inner row much smaller. Scales on upper part of head reaching to frontborder of eye. Dorsal spines increasing in size posteriorly to the fifth, which is the longest, the following ones slightly decreasing in length again. Membranes between the spines deeply incised and lobated. Second anal spine very strong, as long as head without snout. Caudal deeply emarginate. Head, back, and sides bright blue. Thorax, belly, and caudal peduncle yellowish, except superior part of caudal peduncle, which is blue. Two dark almost parallel bands from snout to frontborder of eye, separated by a narrower blue band. Dorsal ashy grey, the scaly sheath blue. Ventrals and anal yellowish. Caudal yellowish, with a large triangular patch, the point of which is directed forward. Pectorals hyaline, with a black spot superiorly at its base. Length 40 mm.

Habitat: Timor; Kei Islands!. — Philippines.

Note. If the synonymy as given above is right, the yellowish colour can also spread over the whole head, body, and tail, as in *cyaneus* Blkr. or be restricted to the tail, as in *parasema*. Fowler figures this last species as having the inferior preopercular limb broadly naked, but Montalban's figure shows a row of scales on the inferior limb and in the text the posterior limb only is mentioned as unscaled.

I have united *cyaneus* Blkr. (nec Q. G.) with *hemicyaneus*. The reason why I don't agree with Fowler & Bean, who assimilate it with their *bleekeri*, is explained in a note under lastnamed species.

24. **Abudefduf assimilis** (Gthr.)

?*Glyphisodon uniocellatus* Quoy & Gaimard, Voyage de l'Uranie et de la Physicienne. Zool. 1824, p. 393.
Glyphisodon uniocellatus Bleeker, Nat. Tijdschr. Ned. Indië IV, 1853, p. 119.
Glyphidodon assimilis Günther, Cat. Brit. Mus. IV, 1862, p. 52.
Glyphidodontops uniocellatus Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 133. — Atl. Ichth. IX, 1877. Tab. 410, fig. 6.
Abudefduf assimilis M. Weber, Siboga Exp. Fische 1913, p. 351.
Chrysiptera assimilis Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 102.

D. XIII. 12 (13). A. II. 13. P. 2. 15. V. I. 5. Ll. 16—17 + 8—9. Ltr. $\dfrac{1\frac{1}{2}-2}{\frac{1}{9}}$. Sq. l. 26.

Height 2.1—2.2, 2.7—2.8 in length with caudal. Head 3.2—3.5, 4.2—4.6 in length with caudal. Length of head 1—1.1 in its height. Eye 2.5—2.9. Snout two thirds of eye. Interorbital space almost flat, slightly less than eye. Mouth oblique. Maxillary reaching to below eye, almost to below vertical through front of pupil. Teeth rounded at tip, in two series. Preorbital and suborbital naked. Two transverse rows of scales on preopercle. A narrow inferior and a somewhat broader posterior limb naked. Scales on upper part of head covering interorbital space, but not reaching to nostrils. First dorsal spine about half length of eye, following gradually increasing in length to the fourth. Lastnamed and following spines subequal, as long as snout and eye. Membranes between the dorsal spines deeply incised. $1^1/_2$—2 scales between lateral line and scaly sheath of dorsal below last spine. Soft dorsal more or less pointed, the longest rays equal to head or to head without snout. First anal spine less than half length of second, which is equal to longest dorsal spines. Soft anal similar to soft dorsal. Pectorals equal to head, ventrals with the first ray produced, somewhat longer. Caudal somewhat emarginate, the lobes rounded. Colour of preserved specimens vinous red, but most scales with a lack-like, shining bluish white edge, variously developed, generally covering most of the scales on upper part of head, but leaving as a rule a median line without it, also on back and on dorsal sheath. A band of the same colour from frontborder of eye to snout, joining that of the other side. A narrower one below it, from lower border of eye to middle of maxillary, leaving a darker band between them, which is continued through eye and beyond eye. Fins yellowish. A deep black blotch, more or less encircled by shining bluish white, at base of median dorsal rays. Length 63 mm.

Habitat: Java; Borneo; Borneo Bank!; Saleyer!; Sulu Islands!; Sangi Islands; Ternate; Batjan; Ceram; Ambon!; Haruko; Nusa Laut!; Goram; Letti; Rotti!; Samau!; Timor!; Kei Islands!. — Philippines, Pelew Islands, New Hanover, Solomon Islands, Fiji. In sea, on reefs.

Note. All specimens from the Indo-australian Archipelago examined by me have the dark ocellus on the dorsal at the base of the median rays and therefore agree with *assimilis* Gthr. and not with *uniocellatus* as described by the same author (Cat. Brit. Mus. IV, 1862, p. 52). I am not sure that this last species is identical with *uniocellatus* Q. G. The lastnamed authors based their description on specimens from Timor (Kupang) and the Marianas. It is quite possible that the specimen from the first locality is identical with *assimilis* and from the last with *uniocellatus* Gthr., but without reexamination of the type nothing can be said for certain.

25. **Abudefduf cyaneus** (Q. G.)

Glyphisodon cyaneus Quoy & Gaimard, Voyage de l'Uranie et de la Physicienne. Zool. 1824, p. 392.
Glyphisodon azureus Cuvier & Valenciennes, Hist. Nat. Poissons V, 1830, p. 479.
Abudefduf cyaneus Evermann & Seale, Bull. Bur. Fish. XXVI, (1906) 1907, p. 92.
Abudefduf sapphirus Jordan & Richardson, ibid. XXVII (1907) 1908, p. 264.
?*Chrysiptera cyanea* Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 101.
Glyphisodon hedleyi Whitley, Rec. Austr. Mus. XVI, 1927, p. 20.
Abudefduf cyaneus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 168.
Abudefduf cyaneus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 321.

Abudefduf hedleyi Fowler, ibid. p. 323.
Iredaleichthys hedleyi Whitley, Mem. Queensl. Mus. IX, Part III, 1929, p. 242.
Iredaleichthys sapphirus Roxas & Martin, Techn. Bull. Bur. Sc. Manila VI, 1937, p. 195.

D. XIII. 11—12 (13). A. II. 11—13. P. 17. V. I. 5. Sq. l. 27. Ltr. $\begin{array}{c}3\\\hline 1\\\hline 9-10\end{array}$.

Height 2.3—2.5. Head 3.4—3.5. Eye 3. Snout shorter than eye. Preorbital and suborbital without scales. No notch between the two bones. Two transverse rows of scales on preopercle. A narrow inferior preopercular limb naked. Teeth uniserial. Scales on upper part of head reaching to between eyes. Median dorsal spines slightly longer than anterior and posterior ones. Membranes between the spines deeply incised. Second anal spine equal to postorbital part of head. Caudal slightly emarginate, almost truncate. Colour blue, including the vertical fins, but the caudal may be yellowish. A dark line from snout, through eye to superior part of opercle; another from snout to lower border of eye. One or two similar bands on preopercle. Scales of body often with black spots. Length 75 mm (Compiled, not seen by me).

Habitat: Timor, New Guinea (Dauce Island, off Port Moresby). — Riu Kiu Islands, Philippines, Marianas, New Hebrides, Samoa. In sea.

Note. Although I have not seen specimens I am almost sure that *sapphirus* and *hedleyi* belong to the same species. I am less sure about *cyaneus* Q. G. The description of this species is short and the figure published by the French authors does not show the details necessary to give it its place among the other species of the genus. It is chiefly on two points, mentioned in the text and apparent in the figure, that I base the synonymy, tentatively given above. These points are the truncate caudal and the blue colour of the fish. It is true that the fins are described and represented as being yellow, whereas in *sapphirus* and *hedleyi* the vertical fins are blue, the caudal only sometimes being yellow.

26. **Abudefduf bleekeri** Fowler & Bean.

Abudefduf bleekeri Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 165. Pl. 15.
Iredaleichthys bleekeri Roxas & Martin, Techn. Bull. Bur. Sc. Manila VI, 1937, p. 195.

D. XIII. 13—14. A. II. 12—13 (14). Ll. 15—16 + 7—11. Ltr. $\begin{array}{c} 3\text{—}4 \\ \hline 1 \\ \hline 9\text{—}10 \end{array}$.

Height $2^{1}/_{4}$—$2^{1}/_{3}$. Head $3^{1}/_{8}$—$3^{1}/_{3}$. Snout 4—$4^{2}/_{5}$ in head. Eye $2^{2}/_{5}$—3, 1 in interorbital space or little greater in young. Maxillary reaches eye. Scales on upper part of head reaching to before eyes, but not as far as nostrils. Preorbital and suborbital without notch, scaleless. Two transverse rows of scales on preopercle, a broad inferior and a narrow posterior limb naked. Dorsal spines gradually increasing in length to the fifth which is subequal to the following spines. Membranes between the spines deeply incised. Second anal spine about equal to postorbital part of head. Caudal forked. Pale gray brown. Body everywhere, except fins, spotted and blotched with gray blue. Spots large on cheek and opercle, fine and crowded on head above. On vertical fins base of each scale with small blue spot or dot. Fins all pale or light brownish. Anal with 2 submarginal grayish parallel lines below. Pectoral with small inconspicuous dusky spot, much less than pupil, at fin origin. Length 78 mm (After the description and the figure of Fowler & Bean, not seen by me).

Habitat: Sulu Islands. — Philippines.

Note. Fowler & Bean consider *cynaneus* Blkr. as a synonym of this species, but I very much doubt if they are right. I agree that Bleeker's species is probably not identical with *cyaneus* Q. G. and with some doubt I have united it with *hemicyaneus* but as Fowler & Bean figure the inferior preopercular limb in *bleekeri* as broadly naked, it cannot be the same as *cyaneus* Blkr., where the inferior limb is scaly.

27. **Abudefduf xanthozona** (Blkr.)

Glyphisodon xanthozona Bleeker, Nat. Tijdschr. Ned. Indië IV, 1853, p. 283.
Glyphidodon xanthozona Günther, Cat. Brit. Mus. IV, 1862, p. 43.
Glyphidodontops albofasciatus Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N^{0} 6, 1877, p. 136. — Atl. Ichth. IX, 1877, Tab. 405, fig. 6 (nec Hombr. & Jacq.).
Glyphidodon amabilis De Vis, Proc. Linn. Soc. New S. Wales VIII, 1883, p. 452.
Abudefduf amabilis Jordan & Seale, Bull. Bur. Fish. XXV (1905) 1906, p. 287.
Abudefduf albofasciatus M. Weber, Siboga Exp. Fische 1913, p. 354 (nec Hombr. & Jacq.).
Chrysiptera amabilis Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 104.
Abudefduf amabilis Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 177.

Abudefduf amabilis Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 324.
Abudefduf xanthozona Fowler, ibid. p. 325.
Glyphidodontops amabilis Whitley, Mem. Queensl. Mus. IX, Part III, 1929, p. 226, p. 242.

D. XIII. 12—13. A. II. 11—12. P. 2. 16. V. I. 5. Ll. 17—20 + 7—9. Ltr. $\begin{array}{c}1\frac{1}{2}-2\\ \hline 1\\ \hline 9\end{array}$. Sq. l. 27—28.

Height 2.3—2.7, 2.9—3.4 in length with caudal. Head 3.3—3.7, 4.1—4.7 in length with caudal. Length of head 1—1.2 in its height. Eye 2.7—3. Snout two thirds of eye. Interorbital space somewhat convex, less than eye. Mouth somewhat oblique. Maxillary reaching to below frontborder of eye. Teeth truncate, in two series. Preorbital not notched. Preorbital and suborbital naked. Three transverse rows of scales on preopercle. A broad inferior and posterior limb naked. Scales on upper part of head covering interorbital space but not reaching to nostrils. Dorsal spines increasing in length to the fourth, which is subequal to the following and as long as snout and eye together. Membranes between the spines incised. $1^{1}/_{2}$ to 2 scales between lateral line and scaly sheath of dorsal below the last spine. Soft dorsal slightly pointed, the longest rays equal to head without snout. First anal spine less than half length of second, which is as long as longest dorsal spines. Anal rounded, the longest rays equal to head without snout. Pectorals equal to head without snout or slightly longer. Ventrals with the first ray produced, as long as head. Caudal emarginate. Colour of preserved specimens brown or greyish. A silvery white transverse band along hindborder of opercle. An oblique band of the same colour from below 5th and 6th dorsal spines to anal region. A third band on caudal peduncle. A fourth but fainter band may be present between the second and the third, running from below last dorsal spines to base of middle of anal, sometimes only developed in its superior half but generally wanting. Some bluish white spots on scales of preopercle and sometimes also on opercle and at base of pectoral. Dorsal brown or grey at base, whitish distally. Spinous dorsal sometimes with a narrow dark edge. Sometimes a dark blotch at the base of the posterior rays. Anal brown or grey, with a more or less distinct longitudinal light band. Caudal dark brown in its basal half, the colour generally more pronounced at base of superior rays, creamy in its distal half, the median rays tipped with brown. Ventrals dark brown or grey, pectorals creamy. Length 70 mm.

Habitat: Pulu Weh!; Sumatra (Kauer, Trussan); Celebes (Menado); Karkaralong Islands!; Sula Islands!; Buru; Ambon; Ceram; Tiur!; Roma!. — Seychelles, Mauritius, Ceylon, Japan, Philippines, Ponapé, Oualan, Solomon Islands, New Hebrides, Coast of Queensland, Murray Island, Fouturna, Fiji, Samoa, Tahiti, Hawaii.

Note. Bleeker confused this species with *albofasciatus* Hombr. & Jacq. Günther (Fische der Südsee II, 1881, p. 232) considered it as a variety of *brownriggi* (= *biocellatus*). This may be right but as I find no transitions between the two I keep it as a separate species.

28. **Abudefduf biocellatus** (Q. G.)

Glyphisodon biocellatus Quoy & Gaimard, Voyage de l'Uranie et de la Physicienne. Zool. 1824, p. 389.
Chaetodon brownriggii Bennett, Fishes of Ceylon, 1828, N⁰ 8.
Glyphisodon glaucus Cuvier & Valenciennes, Hist. Nat. Poissons V, 1830, p. 475.
Glyphisodon unimaculatus Cuvier & Valenciennes, ibid. p. 478.
Glyphisodon antjerius Cuvier & Valenciennes, ibid. p. 481.
Glyphisodon biocellatus Cuvier & Valenciennes, ibid. p. 482.
Glyphisodon zonatus Cuvier & Valenciennes, ibid. p. 483.
Glyphisodon modestus Schlegel & Müller, Verh. nat. gesch. Ned. overz. Bezitt. Zool. 1839—1841. Overzigt Amphiprion, etc. p. 23.
Glyphisodon balinensis Bleeker, Verh. Bat. Gen. XXII (1848) 1849. Ichth. Bali, p. 9.
Glyphisodon modestus Bleeker, Nat. Tijdschr. Ned. Indië IV, 1853, p. 285.
Glyphisodon biocellatus Bleeker, ibid. p. 286.
Glyphisodon Rossi Bleeker, ibid. VII, 1854, p. 48.
Glyphidodon antjerius Günther, Cat. Brit. Mus. IV, 1862, p. 50.
Glyphidodon unimaculatus Günther, ibid. p. 51.
Glyphidodon modestus Günther, ibid. p. 55.
Glyphidodon antjerius Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 527.
Glyphidodon antjerius Day, Fishes of India, Part III, 1877, p. 387.
Glyphidodon modestus Day, ibid. p. 388.
Glyphidodontops modestus Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 131. — Atl. Ichth. IX, 1877. Tab. 403, fig. 9.
Glyphidodontops antjerius Bleeker, ibid. p. 134. — ibid. Tab. 410, fig. 2.
Glyphidodontops zonatus Bleeker, ibid. p. 138. — ibid. Tab. 407, fig. 3.
Glyphidodontops unimaculatus Bleeker, ibid. p. 140. — ibid. Tab. 407, fig. 5.
Glyphidodon brownriggii Günther, Fische der Südsee II, 1881, p. 232.
Glyphidodon brownriggii Waite, Proc. Linn. Soc. New S. Wales IX, Part 2, 1894, p. 219. — Mem. Austr. Mus. III, 1899, p. 192 (sine syn.).
Glyphidodon brownriggii Steindachner, Abh. Senckenb. naturf. Ges. XXV, 1901, p. 441. — Denkschr. Akad. Wien LXXI, 1902, p. 149.

Chrysiptera modesta Fowler, Journ. Acad. Nat. Sc. Philadelphia (2) XII, Part IV, 1904, p. 535.

Glyphidodontops antjerius Steindachner, Sitzber. Akad. Wien CXV, 1906, p. 1396.

Abudefduf glaucus Jordan & Seale, Bull. Bur. Fish. XXV (1905) 1906, p. 286.

Abudefduf zonatus Jordan & Seale, l.c.

Abudefduf antjerius Jordan & Seale, ibid. p. 287.

Abudefduf unimaculatus Jordan & Richardson, ibid. XXVI (1906) 1907, p. 93.

Abudefduf glaucus Jordan & Richardson, ibid. XXVII (1907) 1908, p. 264.

Abudefduf antjerius Kendall & Goldsborough, Mem. Mus. Comp. Zool. Harvard Coll. XXVI, N⁰ 7, 1911, p. 297.

Abudefduf antjerius Snyder, Proc. U. S. Nat. Mus. XLII, 1912, p. 419.

Abudefduf modestus M. Weber, Siboga Exp. Fische 1913, p. 350.

Abudefduf Brownriggii M. Weber, ibid. p. 352.

Abudefduf Brownriggii, var. *zonatus* M. Weber, ibid. p. 353.

Abudefduf unimaculatus M. Weber, ibid. p. 354.

Abudefduf brownriggii De Beaufort, Bijdr. Dierk. Afl. 19. 1913, p. 128.

Glyphisodon brownriggii Barnard, Ann. S. Afric. Mus. XXI, 1925—1927, p. 739.

Glyphisodon zonatus Whitley, Austr. Zoologist IV, Part 4, 1926, p. 230.

Abudefduf biocellatus Fowler & Bean, Proc. U. S. Nat. Mus. LXXI, Art. 10, 1927, p. 15.

Chrysiptera brownriggii Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 105 (sine syn.).

Chrysiptera glauca Montalban, ibid. p. 111.

Abudefduf unimaculatus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 145.

Abudefduf biocellatus Fowler & Bean, ibid. p. 166.

Abudefduf glaucus Fowler & Bean, ibid. p. 169.

Abudefduf zonatus Fowler & Bean, ibid. p. 179.

Abudefduf unimaculatus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 319.

Abudefduf biocellatus Fowler, ibid. p. 321.

Abudefduf glaucus Fowler, ibid. p. 322.

Abudefduf zonatus Fowler, ibid. p. 325.

Iredaleichthys modestus Whitley, Mem. Queensl. Mus. IX, Part III, 1929, p. 242.

Glyphidodontops biocellatus Whitley, Rep. Brit. Mus. Great Barrier Reef Exp. IV, N⁰ 9. Fishes, 1932, p. 292.

Abudefduf zonatus Fowler, Occas. Papers B. P. Bishop Mus. IX, 20, 1932, p. 12.

Abudefduf glaucus Fowler, ibid. IX, 18, 1932, p. 13. — Proc. Acad. Nat. Sc. Philadelphia LXXXVI, 1934, p. 491.

Abudefduf biocellatus Hora & Mukerji, Rec. Indian Mus. XXXVIII, 1936, p. 26.

Abudefduf brownriggi Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 299.

Abudefduf glaucus Herre, ibid. p. 302.

Iredaleichthys glaucus Roxas & Martin, Techn. Bull. Bur. Sc. Manila VI, 1937, p. 195.

D. XIII. 12—14. A. II. 12—13 (14). P. 2. 15—17. V. I. 5. Ll. 16—19 + 7—8. Ltr. $\frac{1\frac{1}{2}-2}{\frac{1}{9}}$. Sq. l. 26—28.

Height 2.1—2.5, 2.7—3.1 in length with caudal. Head 3.1—3.6, 3.9—4.7 in length with caudal. Length of head 1—1.2 in its height. Eye 2.9—3.6, equal to or somewhat more than snout. Interorbital space slightly convex, equal to eye or somewhat less than eye. Mouth somewhat oblique. Maxillary reaching to below frontborder of eye. Teeth rounded at tip, in two rows. Depth of preorbital twice or somewhat more than twice in eye. Preorbital not notched. Preorbital and suborbital scaleless. Three, posteriorly sometimes two, transverse rows of scales on preopercle, the inferior and posterior limbs broadly naked. Scales on upper part of head covering interorbital space, but not reaching to nostrils. Dorsal spines slightly increasing in length posteriorly, the last one equal to snout and eye together. Membranes between the spines incised. $1^1/_2$ to 2 scales between lateral line and scaly sheath of dorsal below last spine. Soft dorsal rather pointed, the longest rays equal to head without snout or somewhat shorter. First anal spine less than half length of second, which is equal to or slightly longer than last dorsal spine. Soft anal similar to soft dorsal. Ventrals with the first ray somewhat produced, equal to head or nearly so. Pectorals slightly shorter. Caudal slightly forked, the lobes rounded. Young specimens are reddish brown, lighter below. A light blue band, more or less bordered with dusky, beginning on median line above upper lip and meeting here that of the other side, running through upper border of eye, along base of dorsal where it ends near a large black ocellus, encircled by light blue, situated on the basal part of the posterior spines and on back above lateral line. The last part of this band may be broken into a row of spots. A similar blue band from middle of upper lip, through inferior part of eye, and continued beyond in a row of spots. Similar spots may be scattered on sides of head and body. A smaller, black, blue edged ocellus at base of posterior rays of dorsal rarely absent. Sometimes a black spot superiorly on caudal peduncle. In older specimens the first ocellus generally disappears; sometimes its place is only indicated by a circular row of minute blue spots, the rest of its edge. The band from head to dorsal generally disappears also, after first having been broken up in a row of spots. In other specimens the band remains and even grows to a greater breadth and it is continued to the ocellus in the dorsal axil (*antjerius*). In large specimens generally only the posterior ocellus remains as a dark blotch, there may be still traces of blue spots on the head (*unimaculatus*). In some specimens the blotch on the last dorsal rays is not developed, and the colour of the fish is uniform, sometimes with a few blue streaks on the head (*glaucus* = *modestus*). Some specimens show a silvery vertical band, a few scales broad, below the fourth and fifth dorsal spines, and reaching to above middle of ventrals (*zonatus*). Ventrals and anal generally dark, caudal and soft dorsal generally light. Length 96 mm.

Habitat: Pulu Weh!; Sumatra (Kauer, Trussan, Priaman, Ulakan, Tiku, Padang!, Benkulen); Nias!; Pulu Nako!; Java (Anjer, Batavia, Karangbollong, Palabuhanratu!, Prigi); Duizend Islands!; Bawean; Strait Madura!; Kangeang!; Bali; Borneo; Celebes (Menado!, Tanawanko); Basa Reef; Gulf of Boni; Siau!; Sangi Islands; Talaut Islands!; Sulu Islands!; Kabaëna!; Lombok!; Sumba!; Flores!; Lomblen!; Solor!; Savu!; Rotti!; Timor!; Roma!; Sula Islands!; Buru; Ceram!; Ambon!; Lucipara Islands!; Nusa Laut; Goram; Banda!; Haruku; Ternate; Halmahera!; Tiur!; Aru Islands; Waigeu!; New Guinea (Manokwari); Schouten Islands. — Coast of Natal, Mozambique, Zanzibar, Mauritius, Coast of South Arabia, Red Sea, Coasts of British India, Ceylon, Burma, Andamans, Nicobars, Cocos Keeling Islands, Japan, China, Riu Kiu Islands, Formosa, Philippines, Pelew Islands, Guam, Rota, Carolines, Admirality Islands, Santa Cruz Islands, New Hebrides, New Caledonia, Coast of Queensland, Lord Howe Island, Marshall Islands, Nauru, Funafuti, Rotuma, Fiji, Phoenix Islands, Samoa, Tonga Islands, Cook Islands, Society Islands, Paumotu Islands, Christmas Island, Hawaii. In sea, on and near reefs.

29. **Abudefduf lacrymatus** (Q. G.)

Glyphisodon lacrymatus Quoy & Gaimard, Voyage de l'Uranie et de la Physicienne. Zool. 1824, p. 388.

Glyphisodon lacrymatus Cuvier & Valenciennes, Hist. Nat. Poissons V, 1830, p. 478.

Glyphisodon lacrymatus Bleeker, Nat. Tijdschr. Ned. Indië VIII, 1855, p. 303.

Glyphidodon lacrymatus Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 527 (partim).

Glyphidodon (Stegastes) lacrymatus Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 111. — Atl. Ichth. IX, 1877. Tab. 404, fig. 6.

Glyphidodon lacrymatus Günther, Fische der Südsee II, 1881, p. 232.

Abudefduf lacrymatus Jordan & Seale, Bull. Bur. Fish. XXV (1905) 1906, p. 285.

Abudefduf lacrymatus Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 93.

Abudefduf lacrymatus Fowler & Bean, Proc. U. S. Nat. Mus. LXXI. Art. 16. 1927, p. 15. — Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 151.

Abudefduf lacrymatus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 320. — ibid. XI, N⁰ 5, 1931, p. 352.
Abudefduf lacrymatus Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 295.
Negostegastes lacrymatus Roxas & Martin, Techn. Bull. Bur. Sc. Manila VI, 1937, p. 196.

D. XII. 16—17. A. II. 13. P. 2. 16. V. I. 5. Ll. 19 + 7. Ltr. $\begin{array}{c}3\\ \hline 1\\ \hline 9-10\end{array}$. Sq. l. 27.

Height 1.8—1.9, 2.3 in length with caudal. Head 2.9—3, 3.6—3.7 in length with caudal. Length of head 1.1—1.2 in its height. Eye 2.7—3, longer than snout and about equal to slightly convex interorbital space. Mouth somewhat oblique. Maxillary reaching almost to below frontborder of eye. Teeth truncate or slightly emarginate. Preorbital not notched. Suborbital narrow, both bones with a row of scales. Three transverse rows of scales on preopercle, the inferior and the lower part of the posterior limb scaly. Scales on upper part of head reaching to tip of snout. Dorsal spines subequal or slightly increasing in length posteriorly, equal to postorbital part of head. Soft dorsal pointed, the longest ray almost as long as head without snout. Dorsal with a thick and high scaly sheath. First anal spine minute, second slightly longer than longest dorsal spine. Soft anal similar to soft dorsal, and with a thick scaly sheath. Pectorals as long as head, ventrals with the first ray produced, reaching anal, slightly longer than pectorals. Caudal deeply forked. Colour of preserved specimens deep brown. Caudal peduncle and caudal yellowish. Head and body with scattered light blue spots, more crowded on head below eye and forming here more or less developed longitudinal bands. Dorsal and anal dark brown, some of the scales of the sheath with light spots. Pectorals dusky, with a more or less developed black band along its base. Ventrals blackish. In the young ones the spots on body and head are relatively larger and there is a black blotch on median part of spinous dorsal. Length 105 mm.

Habitat: Sumatra (Benkulen); Java (Karangbollong); Borneo Bank!; Sangi Islands; Talaut Islands!; Sulu Islands; Doworra Island; Gomomo Island; Makian; Ternate; Batjan; Ceram; Timor!; Rotti!; Banda; New Guinea (Manokwari). — Red Sea, Ceylon, Philippines, Marianas, Solomon Islands, New Hebrides, Samoa, Tahiti. In sea, on reefs.

30. **Abudefduf leucozona** (Blkr.)

Glyphisodon leucozona Bleeker, Nat. Tijdschr. Ned. Indië XIX, 1859, p. 338.
Glyphidodon leucozona Günther, Cat. Brit. Mus. IV, 1862, p. 49.

Glyphidodon cingulum Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 526.
Glyphisodon (*Stegastes*) *leucozona* Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N° 6, 1877, p 112. — Atl. Ichth. IX, 1877. Tab. 407, fig. 2.
Glyphisodon leucozona Waite, Rec. Austr. Mus. V, 1904, p. 235.
Abudefduf leucozona M. Weber, Siboga Exp. Fische 1913, p. 349.
Glyphisodon leucozona McCulloch, Austr. Zoologist II, Part III, 1922, p. 95.
Glyphisodon leucozona Barnard, Ann. S. Afric. Mus. XXI, 1925—1927, p. 741.
Abudefduf leucozona Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 92.
Negostegastes leucozona Whitley, Mem. Queensl. Mus. IX, Part III, 1929, p. 225, p. 241.
Abudefduf leucozonus Fowler, Proc. Acad. Nat. Sc. Philadelphia LXXXVI, 1934, p. 491.
Abudefduf leucozona Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 295.

D. XII. 15 1). A. II. 12—13. P. 2. 17. V. I. 5. Ll. 15—20 + 6—7. Ltr. $\dfrac{3}{\dfrac{1}{10}}$. Sq. l. 28.

Height 1.9—2, 2.5—2.6 in length with caudal. Head 3.2, 4.1 in length with caudal. Length of head 1.1 in its height. Eye 2.7—3, slightly more than convex interorbital space. Snout about three fourths of eye. Mouth horizontal anteriorly, curved obliquely downwards laterally. Maxillary reaching to below frontborder of eye. Teeth truncate, in a single series. Preorbital not notched, slightly deeper than suborbital. Preorbital naked, suborbital with a row of scales. Three transverse rows of scales on preopercle, and one row on inferior limb. A narrow posterior limb naked. Scales on upper part of head reaching beyond nostrils, the anterior ones smaller than the others. Fourth to tenth dorsal spines subequal, and longer than the others, as long as snout and eye together. Soft dorsal somewhat pointed, the longest ray equal to head without snout. First anal spine minute, second one as long as head without snout. Soft anal similar to soft dorsal. Scaly sheaths of vertical fins well developed. Ventrals with the first ray produced, reaching to vent, as long as head. Pectorals slightly shorter. Caudal forked. Colour of preserved specimens brownish red, sides of head, and throat, lighter. A whitish transverse band from below 3rd to 6th dorsal spines down to before vent. Some of the scales especially on belly, each with a light spot. A row of light bluish spots on preorbital, most scales of preopercle also each with a similar spot. In young

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1) In one specimen from a lot of four from the same locality I find D. XIII. 14.

specimens the spots on suborbital form a light bluish line below eye, and a very narrow line of the same colour runs from the frontborder of the eye to the snout. Another similar line from upper border of eye to point of snout, where it joins that of the other side. A round, black, white edged ocellus at base of posterior dorsal or slightly more forwards, often obsolete in adults. A black patch on back of caudal peduncle, immediately behind dorsal. Dorsal, anal, and ventrals dusky. Caudal and pectorals lighter. A triangular black blotch superiorly at base of pectoral. Length 126 mm.

Habitat: Pulu Weh!; Java (Karangbollong); Sumba!; Solor. — Coast of Natal, Red Sea, Philippines, Pelew Islands, Guam, New Hebrides, Coast of New South Wales, Fiji, Samoa?, Society Islands, Marquesas Islands. In sea.

31. **Abudefduf dickii** (Liénard)

Glyphisodon dickii Liénard, Dix. Rap. Soc. Hist. Nat. Maurice, 1839, p. 35.
Glyphidodon Dickii Bleeker, Ned. Tijdschr. Dierk. I, 1863, p. 274.
Glyphidodon unifasciatus Kner & Steindachner, Sitzber. Akad. Wien LIV, 1867, p. 375.
Glyphidodon (Stegastes) Dickii Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 115. — Atl. Ichth. IX, 1877. Tab. 409, fig. 7.
Glyphidodon dickii Günther, Fische der Südsee II, 1881, p. 232.
Glyphidodon Dickii Sauvage, Poissons de Madagascar 1891, p. 432.
Abudefduf dicki Jordan & Seale, Bull. Bur. Fish. XXV, (1905) 1906, p. 285.
Abudefduf dicki Jordan & Richardson, ibid. XXVII, (1907) 1908, p. 263.
Abudefduf Dickii M. Weber, Siboga Exp. Fische 1913, p. 350.
Abudefduf dickii Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 91.
Abudefduf dickii Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 147.
Abudefduf dickii Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 319.
Abudefduf dicki Herre, Field Mus. Nat. Hist. Zool. Ser. XXI, 1936, p. 294.
Negostegastes dickii Roxas & Martin, Techn. Bull. Bur. Sc. Manila VI, 1937, p. 196.

D. XII. 16—18. A. II. 14 (15). P. 2. 17—18. V. I. 5. Ll. 20—22 + 7—9. Ltr. $\begin{array}{c} 2\frac{1}{2}-3 \\ \hline 1 \\ \hline 9-10 \end{array}$. Sq. l. 29.

Height 1.8, 2.3—2.4 in length with caudal. Head 2.9—3.1, 3.7—4.1 in length with caudal. Length of head 1.3 in its height. Eye 3, longer than snout and equal to almost flat interorbital space. Mouth oblique. Maxillary reaching to below nostril or somewhat farther. Teeth crowded, compressed, somewhat rounded, in a single series. Preorbital slightly emarginate, deeper than suborbital, both bones scaly. Three transverse rows of scales on preopercle, the inferior and the posterior limbs scaly. Scales on upper part of head reaching to end of snout, the anterior ones smaller than the others. Dorsal spines slightly increasing in length from the third, the last one about equal to eye and snout together. Soft dorsal pointed, the longest ray equal to head without snout. First anal spine one third or less length of second, which is somewhat longer than postorbital part of head. Soft anal pointed, the longest rays slightly longer than those of dorsal. Scaly sheaths of dorsal and anal well developed. Ventral with the first ray produced, not reaching anal, as long as pectorals, and half length of snout shorter than head. Caudal forked. Colour of preserved specimens: A black transverse band, about 3 scales broad, from base of anterior part of soft dorsal to middle of base of anal, and more or less continued on that fin. Behind this band the tail, caudal, and posterior parts of soft dorsal and anal are creamy white or pinkish. Before the band the colour of the body is reddish brown, each scale with a dark broad vertical streak. Head reddish brown, scales on suborbital and preopercle each with a more or less distinct pale bluish spot. Spinous dorsal with a dark edge. Ventrals dusky. Pectorals hyaline. Length 107 mm.

Habitat: Borneo Bank!; Sulu Islands; Flores!; Timor; Banda; Ambon; Ceram; Buru. — Mauritius, Philippines, Guam, Ponapé, Solomon Islands, Rotuma, Samoa, Society Islands, Palmyra. In sea.

32. **Abudefduf albofasciatus** Hombr. & Jacq.

Glyphisodon albofasciatus Hombron & Jacquinot, Voyage au Pôle Sud, par Dumont d'Urville. Zool. III, 1853, p. 49.

Abudefduf albofasciatus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 324.

D. XII. 16—17. A. II. 13—15. Sq. l. 27. Ll. 20—26 + 4. Ltr. $\begin{array}{c}3\\ \hline 1\\ \hline 8\text{—}9\end{array}$.

Height 1.7—2, head 2.5—3. Eye 2.2—3.4, equal to snout and 1.2 in convex interorbital space. Mouth oblique. Maxillary reaching to below frontborder of eye. Teeth uniserial, slender, compressed, ends rounded to rather obtuse, but not notched. Front half of snout scaleless. Two transverse rows of scales on preopercle and one on inferior limb. Dorsal spines graduated up to fifth, which is the longest and one three fourths of head. Soft dorsal rounded, fourth ray 1.4 in head. First anal spine one third of second, which goes 1.3 in head. Caudal well forked, pointed, equals head. Pectoral as long as head. Ventrals pointed, very slightly less than head. Colour of alcohol specimens seal brown, becoming slightly paler or ecru drab on lower surface of head, chest and breast. White transverse band, scale in width, from fifth predorsal spines down to opercle; second similar white band from fourth to sixth dorsal spines to vent; third white band from behind last dorsal spine to anal base, slightly before its middle; caudal peduncle with transverse black band 3 scales wide, with whitish bordering line in front and behind. Pale blue streak curves along infraorbital. Cheek and opercle with some pale blue spots, little larger on latter. Short blue bar on preorbital. Dorsal and anal terminally dusky brown. Caudal pale yellowish basally, becomes grey white terminally. Pectorals pale olive, base dusky. Ventrals blackish, pale dusky basally. Anal base spotted with pale blue. Length 68 mm. (After Fowler, not seen by me).

Habitat: Pulu Laut. — Wake Island, Johnston Island.

Note. Bleeker united this species with *A. xanthozona.* Hombron & Jacquinot described this fish as having D. XIII. 18, A. II. 12, which is not in accordance with *xanthozona,* but neither with the species described above. Bleeker supposed that 18 was a misprint for 13 and Fowler that the French authors counted the last divided dorsal ray as two. In this case there still remains the discrepancy about the number of dorsal spines. The position of the white transverse bands in the species of Fowler is also different from that in the species of Hombron & Jacquinot. Hence I am not quite convinced that they are the same. An examination of the type, if still in existence, will be necessary to settle this question.

33. **Abudefduf batjanensis** (Blkr.)

Glyphisodon batjanensis Bleeker, Nat. Tijdschr. Ned. Indië VII, 1854, p. 373.
Glyphidodon batjanensis Günther, Cat. Brit. Mus. IV, 1862, p. 47.
?*Glyphidodon batjanensis* Day, Proc. Zool. Soc. London, 1870, p. 696.
Glyphidodon (*Stegastes*) *batjanensis* Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 114. — Atl. Ichth. IX, 1877. Tab. 402, fig. 8.

D. XII. 13—14. A. II. 15—16. P. 2. 14. V. I. 5. Sq. l. 26.

Height about 2, head about 3. Eye 2.5, longer than snout. Maxillary reaching below frontborder of eye. Teeth in a single row. The width of the preorbital, above the angle of the mouth, is less than one half of that of the orbit. The six posterior dorsal spines are nearly equal in length, and higher than the anterior ones. Caudal fin emarginate, with the lobes obtusely rounded. Head and anterior part of the trunk violet, sides and posterior parts and the fins yellow; sides of the head dotted with blue; two blue streaks from eye to the snout; the spinous dorsal violet; a brownish spot at the base of the pectoral. Length 36 mm (After Bleeker and Günther, not seen by me).

Habitat: Batjan, Buru. — Andamans?

Note. This is a juvenile stage of some species of *Abudefduf*. Besides two records by Bleeker and one doubtful one by Day, this species has not been found again.

34. **Abudefduf bimaculatus** (Macl.)

Glyphidodon bimaculatus Macleay, Linn. Soc. New S. Wales VIII, 1883, p. 271.

D. XII. 11. A. II. 12. Sq. l. 26.

Height of body half the total length. Eye large, close, to the snout, and about a diameter apart. Mouth very small. Colour silvery-gray, a black spot above and below the root of the tail; extremities of dorsal and anal fins, blackish. Length 37 mm (Copied after Macleay, not seen by me).

Habitat: New Guinea (South East Coast).

Note. Fowler (Mem. B. P. Bishop Mus. X, 1928, p. 306) first considered this species to be the young of *Dascyllus marginatus,* but later (ibid. XI, N° 6, 1934, p. 436) he recorded it as *A. bimaculatus.* Re-examination of the type will be necessary to settle the position of this species.

Doubtful species

1. **Abudefduf azureopunctatus** Fowler & Bean.

Abudefduf azureopunctatus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 149.

"Depth $1^7/_8$ to 2; head $3^1/_8$ to $3^1/_4$, width $1^2/_3$ to $1^7/_8$. Snout $3^1/_2$ to $3^3/_5$; eye $2^3/_4$ to $3^1/_4$, 1 to $1^1/_4$ in interorbital; maxillary to eye, or little beyond front eye edge, $2^2/_3$ to 3 in head; interorbital $2^7/_8$ to 3, broad, convex. Gill rakers 8 + 16, lanceolate, long, slender. Tubes in lateral line 14 or 15, pores in straight section 9 + 1 or 2; 4 scales above lateral line to spinous dorsal origin, 9 below, 15 predorsal; 3 rows of cheek scales, variably present or absent on infraorbital. Scales with 7 or 8 basal radiating striae; apical denticles 71 to 111, with 2 or 3 transverse series of basal elements; circuli fine. D. XIII, 11, I, thirteenth spine $1^3/_4$ in head, fifth ray $1^1/_8$ to

$1^1/_2$; A. II, 12, I, second spine $1^2/_3$ to 2, sixth ray $1^1/_{10}$ to $1^1/_6$; least depth of caudal peduncle $1^7/_8$ to 2; caudal $2^4/_5$ to 3 in combined head and body, deeply emarginate, upper lobe often little longer; pectoral $3^1/_8$ to $3^3/_5$; ventral $2^7/_8$ to $3^1/_3$. Largely uniform brown, shading little paler on belly and under surface. Scale below origin of lateral line with deep or dusky basal spot, so usually conspicuous. Inconspicuous small gray spots or dots scattered over lower surface of body, especially over anal base and adjacent region. Fins all pale brown, edge of spinous dorsal little deeper. Iris brown and gamboge. No dark spots anywhere on fins. Other examples show whole body finely dotted with gray blue, 1 to 4 or 5 on each of larger scales and usually a pronounced row of larger dots along lower edge of abdomen. Blue dots on head usually inconspicuous and scattered and no line on infraorbitals". (Copied after Fowler & Bean). Length 82 mm.

Habitat: Danawan Island and Si Amil Island, off Borneo; Sulu Islands; Talisse Island; Batjan. — Philippines.

The authors consider this species identical with *lacrymatus* as described and figured by Bleeker and Günther, which according to them is not identical with *Gl. lacrymatus* Q. G. Bleeker gives the fin formula for the dorsal as D. XII. 15—17, and Günther D. XII. 16. *A. azureopunctatus* with one spine more and 5 or 6 rays less can impossibly be the same. As nothing is said about the absence or presence of scales on the snout and on the inferior preopercular limb, I am unable to give it its proper place in the key of the Indo-australian species.

2. **Abudefduf pallidus** (De Vis)

Glyphidodon pallidus De Vis, Proc. Linn. Soc. New S. Wales VIII, 1883, p. 452.
Abudefduf pallidus Jordan & Seale, Bull. Bur. Fish. XXV (1905) 1906, p. 286.
Iredaleichthys pallidus Whitley, Mem. Queensl. Mus. IX, Part III, 1929, p. 227.

Whitley, l.c., says that this species does not come from New Guinea, as stated by Jordan & Seale, l.c., but from the New Hebrides, and hence outside the Indo-australian Region.

7. **Acanthochromis** Gill

(Gill, Proc. Acad. Nat. Sc. Philadelphia, 1863, p. 214).

Heptadecanthus Alleyne & Macleay, Proc. Linn. Soc. New S. Wales I, 1877, p. 343.

Oblong, compressed, body covered with large scales, 31—34 in a longitudinal series from gillopening to base of caudal. Scales on upper part of head reaching to between nostrils. A few scales on preorbital. Suborbital naked, the lower edge of both bones finely denticulated. Mouth scarcely protractile. Teeth conical, pointed, in two rows, the outer row consisting of much stronger and longer teeth, the teeth of the inner row close to, and almost between those of the outer row. Preopercle finely denticulated behind. Anterior part of lateral line consisting of tubes and some scales with pores behind it, the posterior part on caudal peduncle consisting of pores. Dorsal with XVII slender spines and 16—17 rays. Anal with II strong spines and 16 rays. Pectorals pointed, long. Ventrals pointed, with the first ray produced. Caudal deeply forked, the lobes pointed.

Distribution that of the single species known.

1. **Acanthochromis polyacanthus** (Blkr.) (Fig. 51, p. 448).

Dascyllus polyacanthus Bleeker, Nat. Tijdschr. Ned. Indië IX, 1855, p. 503. — Acta Soc. Sc. Indo-Neerl. II, 1857. Derde bijdr. Ichth. Batjan, p. 71.
Dascyllus polyacanthus Günther, Cat. Brit. Mus. IV, 1862, p. 15.
Tetradrachmum polyacanthus Bleeker, Ned. Tijdschr. Dierk. II, 1865, p. 278.
Acanthochromis polyacanthus Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 151. — Atl. Ichth. IX, 1877. Tab. 410, fig. 7.
Heptadecanthus longicaudis Alleyne & Macleay, Proc. Linn. Soc. New S. Wales I, 1877, p. 343.
Heptadecanthus brevipinnis De Vis, ibid. IX, 1885, p. 872.
Heptadecanthus maculosus De Vis, ibid. p. 873.
Abudefduf jordani Seale, Occas. Papers B. P. Bishop Mus. IV, 1906, p. 53.
Acanthochromis polyacanthus M. Weber, Siboga Exp. Fische 1913, p. 357.
Acanthochromis polyacanthus Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 27.
Acanthochromis polyacanthus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 27.
Acanthochromis longicaudis Whitley, Mem. Queensl. Mus. IX, Part III, 1929, p. 246.
Acanthochromis maculosus Whitley, l.c.
Acanthochromis brevipinnis Whitley, l.c.

D. XVII. 16—17. A. II. 16. P. 2. 14. V. I. 5. Ll. 20—21 + 14—15.

Ltr. $\begin{array}{c} 2\frac{1}{2} \\ \hline 1 \\ \hline 12 \end{array}$. Sq. l. 31—34.

Height 1.8—1.9, 2.6 in length with caudal. Head 3.5—3.7, 4.9 in length with caudal. Length of head 1.4—1.5 in its height. Eye 2.5—2.6, more than snout and equal to convex interorbital space. 3—$3^{1}/_{2}$ transverse rows of scales on preopercle and one row on anterior part of inferior limb; the posterior limb naked. Mouth oblique. Maxillary reaching to below frontborder of eye. Dorsal spines increasing in length to the sixth. Sixth to tenth spines subequal, following spines slightly shorter, but the last one as long as the sixth and equal to snout and eye together or a little shorter. Soft dorsal pointed, longest rays almost as long as head. First anal spine somewhat less than second, which is equal to snout and eye together. Soft anal pointed, the longest rays as long as head. Pectorals and ventrals subequal, longer than head. Caudal deeply forked, the lobes pointed. Colour of preserved specimens dark brown, some scales of body and head with dark spots. Fins dark, pectorals with some dark spots and a dark blotch superiorly at its base. Length 140 mm.

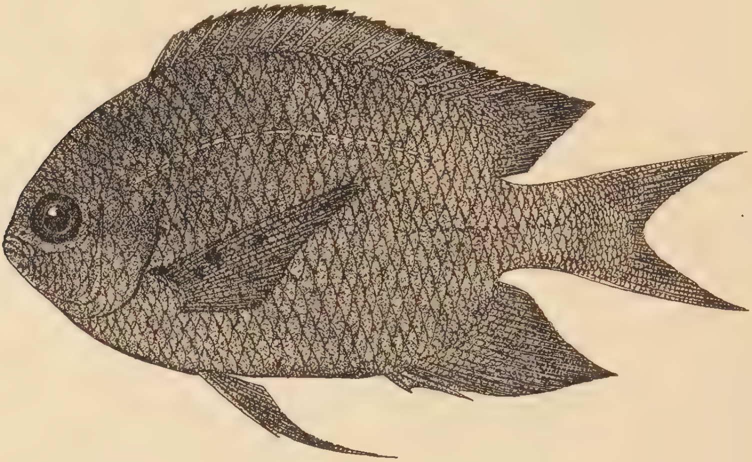

Fig. 51. *Acanthochromis polyacanthus* (Blkr.) n. s.

Habitat: Sulu Islands; Sangi Islands; Celebes (Libani Bay); Tidore; Maitara; Makian; Halmahera; Doworra Island; Batjan; Ambon; Kei Islands!. — Philippines, New Britain, Solomon Islands, Coast of Queensland, New Hebrides. In sea.

8. **Chromis** Cuvier

(Cuvier, Mém. Mus. Hist. Nat. Paris I, 1815, p. 393).

Heliases Cuvier, Règne Animal, Ed. II, II, 1829, p. 173.
Hoplochromis Fowler, Proc. Acad. Nat. Sc. Philadelphia, 1918, p. 66.

Oval or oblong. Mouth oblique, protractile. Teeth conical, and pointed, in more than one row, the teeth of the outer row enlarged, the teeth of the inner rows sometimes very small, seldom wanting. Preorbital and suborbital with a smooth edge, generally scaly. Hindborder of preopercle smooth or rough, but without regular serrations. Scales large. Dorsal, anal, and caudal with a more or less developed scaly sheath, that of the spinous dorsal may be wanting. Dorsal consisting of XII—XIV spines and 9—15 soft rays. Anal with II spines and 10—15 rays. Caudal emarginate or forked, the lobes sometimes filamentous.

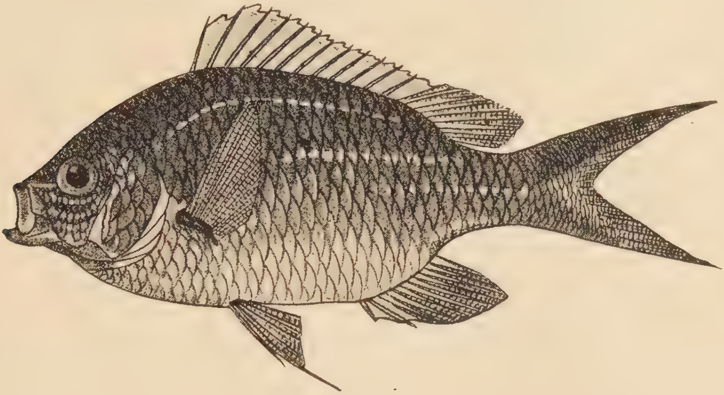

Fig. 52. *Chromis caeruleus* (C. V.) n.s.

Distribution. Small fishes, living on reefs or among rocks of Mediterranean, Red Sea, and tropical parts of Atlantic, Indic, and Pacific.

Key to the Indo-australian species of Chromis

- A. Scales of body each with about 3 basal axillary scales . . . . 1. *Chr. lepidolepis* p. 450.
- B. No axillary scales.
  - *a.* Teeth of outer series in the lower jaw near symphysis horizontal and more or less directed outwards. Twelve, rarely thirteen dorsal spines. Second dorsal spine longest, following decreasing in size . . . . 2. *Chr. caeruleus* p. 451.
  - *b.* Teeth of outer series in the lower jaw not horizontal. Middle dorsal spines longer than the second one.
    - *a′.* Fourteen dorsal spines. Preorbital and suborbital without scales. Dark with a pale longitudinal band . . . 3. *Chr. desmostigma* 453.

b'. Thirteen dorsal spines. Preorbital and suborbital scaly.
  a^2. Second anal spine almost as long as head. Colour uniform . . . . 4. *Chr. analis* p. 454.
  b^2. Second anal spine scarcely longer than postorbital part of head.
    a^3. Median caudal rays light, the lobes dark . . . . 5. *Chr. xanthochir* p. 455.
    b^3. A blackish blotch on median caudal rays. Rest of fin light 6. *Chr. xanthurus* p. 456.
    c^3. Caudal uniform yellowish brown . . . . 7. *Chr. cinerascens* p. 457.
c'. Twelve dorsal spines.
  a^2. Upper and lower lobe of caudal dark brown. Body uniform . . . 8. *Chr. ternatensis* p. 458.
  b^2. Caudal uniform. Dark brown, posterior part of soft dorsal, anal, and caudal peduncle, and caudal abruptly white . . . . 9. *Chr. dimidiatus* p. 460.
  c^2. Caudal uniform. Yellowish brown. A dark transverse band through anterior part of soft dorsal, anterior part of caudal peduncle, and posterior part of anal . . . . . 10. *Chr. retrofasciatus* p. 461.

1. **Chromis lepidolepis** Blkr.

Chromis lepidolepis Bleeker, Versl. Akad. Amsterdam (2) X (1876) 1877, p. 401. — Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 163. — Atl. Ichth. IX, 1877. Tab. 403, fig. 2.

Chromis (*Lepidochromis*) *lepidolepis* Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 58.

Lepidochromis lepidolepis Roxas & Martin, Techn. Bull. Bur. Sc. Manila VI, 1937, p. 199.

D. XII. 11—12. A. II. 10—11. P. 2. 16. V. I. 5. Ll. 17 + 5—7.

Ltr. $\begin{array}{c}3\\\hline 1\\\hline 9\end{array}$.

Height 2. Head 3.1—3.2. Eye 2.2—2.7, greater than snout or than broadly convex interorbital space. Mouth oblique. Maxillary reaching to below pupil or not so far. Teeth biserial, outer row enlarged, especially in front of jaws. Preorbital and suborbital scaly, the scales on suborbital covering its lower edge. Two transverse rows of scales on preopercle and one on inferior limb. Posterior limb naked. Hindborder of preopercle rugose. Scales on upper part of head reaching to between nostrils. Scales of body each with about 3 basal auxillary scales, the median largest. The four anterior dorsal spines somewhat shorter than the following, which are subequal and about as long as suborbital part of head. Soft dorsal rounded, higher than spinous part. Second anal spine 1.3—1.5 in head. Soft anal similar to soft dorsal. Pectorals slightly shorter than head. Ventrals with the first ray produced, slightly longer than head. Caudal deeply forked, the lobes pointed. Colour brown, paler to whitish on under surface of head and abdomen. Fins all dull brown, spinous dorsal and front of anal little deeper. Upper and lower edges of caudal broadly deep brown. Pectorals pale. Ventrals little deeper brown at tips. Length 93 mm (After Bleeker and Fowler & Bean, not seen by me).

Habitat: Danawan Island and Si Amil Island, off Borneo; Celebes (Gulf of Tomini, Limbe Strait); Makian; Maitara; Ambon; Buru; Timor. — Philippines, Formosa. In sea.

2. **Chromis caeruleus** (C. V.) (Fig. 52, p. 449)

Heliases caeruleus Cuvier & Valenciennes, Hist. Nat. Poissons V, 1830, p. 497.
Heliases lepisurus Cuvier & Valenciennes, ibid. p. 498.
Heliases frenatus Cuvier & Valenciennes, l.c.
Glyphisodon bandanensis Bleeker, Nat. Tijdschr. Ned. Indië II, 1851, p. 248.
Heliases frenatus Bleeker, ibid. III, 1852, p. 710.
Heliases caeruleus Bleeker, ibid. VIII, 1855, p. 455.
Heliastes lepidurus Günther, Cat. Brit. Mus. IV, 1862, p. 63.
Heliastes lepidurus Kossmann & Räuber, Verh. Naturh. Med. Ver. Heidelberg I, 1876, p. 34.
Heliastes lepidurus Day, Fishes of India, Part III, 1877, p. 389.
Chromis lepisurus Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 165. — Atl. Ichth. IX, 1877. Tab. 403, fig. 7.
Heliastes lepidurus Günther, Fische der Südsee II, 1881, p. 238.
Heliastes frenatus Sauvage, Poissons de Madagascar 1891, p. 436.
Abudefduf amboinensis Seale, Occas. Papers B. P. Bishop Mus. I, 1901, p. 84 (nec Blkr.).
Chromis lepisurus Steindachner, Sitzsber. Akad. Wien CXV, 1906, p. 1397.
Chromis caeruleus Jordan & Seale, Bull. Bur. Fish. XXV, (1905) 1906, p. 290.
Chromis axillaris Seale, Occas. Papers B. P. Bishop Mus. IV, 1906, p. 55 (nec Benn.).
Chromis caeruleus Kendall & Goldsborough, Mem. Mus. Comp. Zool. Harvard Coll. XXVI, N⁰ 7, 1911, p. 299.
Chromis caeruleus Kendall & Radcliffe, ibid. XXXV, N⁰ 3, 1912, p. 136.
Chromis lepidurus M. Weber, Siboga Exp. Fische 1913, p. 358.
Chromis caeruleus De Beaufort, Bijdr. Dierk. Afl. 19. 1913, p. 129.
Heliastes lepidurus Vinciguerra, Ann. Mus. Civ. Genova (3) X(L), 1926, p. 566.
Chromis caeruleus Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 34.
Chromis lepisurus Whitley, Rec. Austr. Mus. XVI, 1927, p. 24.
Chromis caeruleus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 61.

Chromis caeruleus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 309.
Haplochromis caeruleus Whitley, Mem. Queensl. Mus. IX, Part III, 1929, p. 245.
Chromis caeruleus Herre, Notes Fish. Zool. Mus. Stanford Univ. 1931, p. 69.

D. XII (rarely XIII). 10. A. II. 10 (11). P. 2. 15—16. V. I. 5.

Ll. 14—16 + 8—10. Ltr. $\begin{array}{c}1\frac{1}{2}\\ \hline 1\\ \hline 7-8\end{array}$. Sq. l. 26.

Height 2.1—2.4, 2.8—3.2 in length with caudal. Head 3.1—3.5, 4.2—4.6 in length with caudal. Length of head 1.1—1.2 in its height. Eye 3—3.2, equal to or somewhat less than convex interorbital space. Snout 1—1.3 in eye. Mouth oblique. Maxillary reaching to below frontborder of eye or nearly so. Teeth pointed, in a single row, those in the upper jaw rather slender, the teeth near symphysis more conical. In the lower jaw the teeth near symphysis are short but stout, conical and more or less horizontal, and directed outwards. Preorbital deeper than suborbital, both with a row of scales, which cover the lower edges of the bones. Two transverse rows of scales on preopercle and one on inferior limb. Hindborder of preopercle slightly rugose, especially near its angle. Scales on upper part of head reaching to end of snout. First dorsal spine more than half length of second, which is about as long as third and equal to snout and eye or somewhat shorter. Following spines decreasing in length to the last, which is as long as eye. Soft dorsal somewhat pointed, the middle rays longest and as long as longest spines. First anal spine less than half length of second, which is stouter but shorter than longest spines and about equal to postorbital part of head. First anal rays longer than second spine. Soft anal rounded, the longest rays equal to eye and snout together. Ventrals with the first ray produced, equal to pectorals, slightly less than head. Caudal deeply forked, the lobes pointed. Colour of preserved specimens purplish blue above, the scales with a dark centre, lighter and more or less silvery below. A light blue band from snout to eye, not always distinct. Light blue spots on scales behind and below eye may be present. A more or less developed black band along base of pectoral. Caudal yellowish, the lobes generally blue. Other fins more or less bluish. According to Herre the young ones are green, the adults blue in life. Length 125 mm.

Habitat: Java (Batavia); Bawean; Borneo (Sarawak); Danawan Island and Si Amil Island, off Borneo; Borneo Bank!; Muaras Reef!; Sulu Islands; Celebes (Menado, Gulf of Tomini); Pendek Island; Sumbawa; Flores; Rotti!; Timor; Sula Islands;

Buru; Ceram; Ambon!; Damar!; Ternate; Makian; Banda; Aru Islands; New Guinea. — Madagascar, Zanzibar, Red Sea, Mauritius, Andamans, Cocos Keeling Islands, Philippines, Pelew Islands, Marianas, Carolines, Solomon Islands, Coast of Queensland, Gilbert Islands, New Hebrides, Rotuma, Fiji, Samoa, Society Islands, Paumot Islands.

Common on reefs, in sea. M. Weber, l.c., found specimens as small as 10 mm length on the reefs and he supposes therefore that this species has no pelagic stage.

3. **Chromis desmostigma** Fowler & Bean.

Chromis desmostigma Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 51.

Depth 2 to $2^1/_{10}$; head $2^7/_8$ to 3, width 2. Snout $3^2/_3$ to $3^4/_5$ in head measured from upper jaw tip; eye $2^2/_3$ to 3, greater than snout or interorbital space; maxillary reaches eye or slightly beyond front eye edge, $3^1/_8$ to $3^1/_5$ in head; teeth minute, small, simple, conic, uniserial; interorbital $2^4/_5$ to 3, slightly convex; preorbital, infraorbital, and preopercle edges free and entire. Gill rakers 8 + 16, lanceolate, slender, rather long. Tubes in lateral line 21; pores 10 to 12 in straight section of lateral line; 5 scales above lateral line, 12 below, 22 predorsal forward to front of eye edge; 3 rows of scales on cheek, none on preorbital or infraorbital or preopercle flange; preopercle ridge distinct. D. XIV, 14, fourth spine $2^1/_5$ to $2^1/_3$ in total head length, fifth ray $1^1/_2$ to $1^2/_3$; A. II, 14 or 15, second spine $1^2/_3$ to 2, fifth ray $1^2/_3$ to $1^4/_5$; caudal 1 to $1^1/_5$, rather deeply forked, lobes pointed; least depth of caudal peduncle $2^1/_6$ to $2^2/_5$; pectoral 1 to $1^1/_8$; ventral $1^1/_3$ to $1^2/_5$. Deep brown generally, slightly paler on lower surface of head, breast and belly. Distinct pale brown band from close below beginning of lateral line back to beginning of caudal peduncle above, about one scale in width. Following at caudal base slightly wider pale brownish spot, its length extent of 4 scales. Spinous dorsal dusky, soft dorsal pale, with rays slightly dusky. Lower front of anal dusky, rest of fin paler with rays slightly dusky. Caudal dusky above and below dusky, medianly pale like soft dorsal and anal. Paired fins pale, anterior ventral rays little deeper brown. Pectoral axil pale. Length 37 mm (copied after Fowler & Bean, not seen by me).

Habitat: Sulu Islands. — Philippines.

Note. The absence of scales on preorbital and suborbital, the high number of anal rays and the colour pattern, which according to Fowler & Bean is "totally unlike that of any pomacentrid" makes me doubt if this species belongs to the genus *Chromis*.

4. **Chromis analis** (C. V.)

Heliases analis Cuvier & Valenciennes, Hist Nat. Poissons V, 1830, p. 496.
Heliases macrochir Bleeker, Nat. Tijdschr. Ned. Indië V, 1853, p. 346.
Heliastes analis Günther, Cat. Brit. Mus. IV, 1862, p. 62.
Chromis analis Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 156. — Atl. Ichth. IX, 1877. Tab 405, fig. 1.
Chromis (Dorychromis) analis Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 60.
Chromis analis Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 309.
Dorychromis analis Roxas & Martin, Techn. Bull. Bur. Sc Manila VI, 1937, p. 198.

D. XIII. 11 (12). A. II. 11 (12). P. 2. 16. V. I. 5. Ll. 16 + 7. Ltr. $\begin{array}{c}2\\\hline 1\\\hline 8\end{array}$. Sq. l. 26.

Height 1.9, 2.6 in length with caudal. Head 3.3, 4.4 in length with caudal. Length of head 1.2 in its height. Eye 3, longer than snout and about equal to or somewhat more than convex interorbital space. Preorbital tapering behind, where it joins the very narrow suborbital. Both bones with a row of scales. $2^1/_2$ rows of scales on preopercle and one row on inferior limb. A narrow posterior limb naked. Hindborder of preopercle almost smooth. Mouth somewhat oblique. Maxillary reaching a little beyond vertical through frontborder of eye. Teeth conical, in several rows, those of the outer row enlarged. Scales on upper part of head reaching to before nostrils. First dorsal spine less than eye, 5th to 10th spines longest, equal to snout and eye together. Soft dorsal rounded, median rays longest, about equal to longest spines. First anal spine about one third of second, which is very long, being half length of snout shorter than head and longer than first anal ray. Soft anal truncate. Ventrals with the first ray produced into a filament, as long as head. Pectorals about one eye diameter longer. Caudal deeply forked, the lobes pointed. Colour of preserved specimens brown, back somewhat darker. (Description made after a specimen of 128 mm length from Bleeker's collection in the Amsterdam Museum). Length 145 mm.

Habitat: Danawan Island and Si Amil Island, off Borneo; Buru; Ambon; New Guinea (Port Moresby). — China?, Tonkin, Philippines, Pelew Islands. In sea.

5. **Chromis xanthochir** (Blkr.)

Heliases xanthochir Bleeker, Nat. Tijdschr. Ned. Indië II, 1851, p. 248.
Heliastes xanthochir Günther, Cat. Brit. Mus. IV, 1862, p. 62.
Chromis xanthochir Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 158. — Atl. Ichth. IX, 1877, Tab. 402, fig. 5.
Pomacentrus anabatoides Bean & Weed, Proc. U. S. Nat. Mus. XLII, 1912, p. 608 (nec Blkr.).
Chromis scotochilopterus Fowler, Proc. Acad. Nat. Sc. Philadelphia LXX, 1918, p. 61.
Chromis xanthochir Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 30.
Chromis scotochilopterus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 38.
Chromis reticulatus Fowler & Bean, ibid. p. 40.
Chromis weberi Fowler & Bean, ibid. p. 41.
?*Chromis scotochilopterus* Whitley, Rec. Austr. Mus. XVI, 1928, p. 218.

D. XIII. 10—11. A. II. 11. P. 2. 17. V. I. 5. Ll. 16—18 + 7—10. Ltr. $\begin{array}{c}2\frac{1}{2}\\ \hline 1\\ \hline 8\end{array}$. Sq. l. 26—27.

Height 2.1—2.5, 2.9—3.3 in length with caudal. Head 3.2—3.4, 4.4—4.9 in length with caudal. Length of head 1.1—1.3 in its height. Eye 3, 1—1.1 in somewhat convex interorbital space. Snout two thirds or four fifths of eye. Preorbital tapering posteriorly, where it joins the low suborbital. Both bones with two rows of scales, the lower ones on suborbital covering its inferior edge. Two transverse rows of scales on preopercle and a third on inferior limb, the posterior limb also scaly. Hindborder of preopercle smooth. Mouth oblique. Maxillary reaching to below frontborder of eye. Teeth conical, pointed, in several rows, the teeth of the outer row somewhat enlarged. Scales on upper part of head reaching between or beyond nostrils. First dorsal spine equal to eye, 4th and 5th longest, equal to snout and eye together, posterior spines scarcely shorter. Soft dorsal pointed, the longest rays equal to head without snout or somewhat longer. First anal spine a little less than half length of second, which equals distance between hindborder of opercle and hindborder of pupil. First anal ray longer than the second spine. Soft anal somewhat pointed, the longest ray equal to head without snout. Ventrals with the first ray filamentous, as long as head. Pectorals almost one eye diameter longer. Caudal deeply forked, the lobes pointed, the upper one sometimes filamentous. Colour of preserved specimens brownish or bluish grey, some of the scales of body and tail sometimes lighter, bluish white. The scales of body and tail have sometimes a dark edge, giving them a reticulated appearance. A dark stripe along anterior border of opercle. Dorsal and anal brown or blackish, the posterior dorsal and anal rays white. Median caudal rays light, the lobes brown or blackish. Pectorals and ventrals brownish or dusky, the basal part of the pectoral light. Length 162 mm.

Habitat: Java; Danawan Island and Si Amil Island, off Borneo; Limbe Strait; Celebes; Labuan Blanda; Flores; Timor; Letti; Ternate; Makian; Buru; Ceram; Ambon; Banda. — Philippines, Queensland?. In sea.

Note. The differences between *scotochilopterus, reticulatus,* and *weberi* seem to me only to be differences of colour, and especially the greater or lesser extent of the dark area on soft dorsal, soft anal, and caudal lobes. A specimen which according to its colouration belongs to *reticulatus* differs in no way except the dark edges of the scales from a specimen of *xanthochir* of Bleeker's collection in the Amsterdam Museum. The dark line along and behind preopercle edge, which characterizes *weberi*, has been described by Bleeker for *xanthochir*: "regione operculari anteriore vitta verticali fusca".

6. **Chromis xanthurus** (Blkr.)

Heliases xanthurus Bleeker, Nat. Tijdschr. Ned. Indië VI, 1854, p. 107.
Chromis xanthurus Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 159. — Atl. Ichth. IX, 1877. Tab. 405, fig. 5.
Chromis xanthurus Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 29.
Chromis opercularis Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 47 (nec Gthr?).

D. XIII. 10—11. A. II. 10—12. P. 2. 16. V. I. 5. Ll. 16—17 + 8. Ltr. $\begin{array}{c}3-4\\\hline 1\\\hline 9\end{array}$. Sq. l. 26.

Height about 2. Head 3.1—3.8. Eye 3—3.3, more than snout. Interorbital space very convex, more than eye. Mouth very oblique. Maxillary reaching to below anterior border of eye. Front teeth of lower jaw strong and conical and a series of small ones behind them. Scales on upper part of head reaching to between nostrils. $2-2^1/_2$ transverse rows of scales on preopercle and one row on inferior limb. Preorbital and suborbital scaly. Hindborder of preopercle rough. Fourth and last dorsal spines higher than the rest. Soft dorsal pointed, much higher than spinous part. Second anal spine scarcely longer than postorbital part of head. Pectorals much longer than head. Ventrals with the first ray produced into a filament, slightly shorter. Caudal deeply forked. Colour of preserved specimens violet brown; caudal peduncle and fin yellow, the line of demarcation between this colour and that of the body rather abrupt. Dorsal, anal, and ventrals dark violet brown, and the posterior rays of the first two white to a greater or lesser extent. Axil of pectoral dark. An irregular blackish blotch occupies the centre of the middle caudal rays. Length 160 mm (Compiled, not seen by me).

Habitat: Singapore; Danawan Island and Si Amil Island, Bira Birahan Island, off Borneo; Celebes (Gulf of Boni, Gulf of Tomini, Limbe Strait); Makian; Doworra Island; Banda. — Philippines. In sea.

7. **Chromis cinerascens** (C. V.)

Heliases cinerascens Cuvier & Valenciennes, Hist. Nat. Poissons V, 1830, p. 495.
Heliases cinerascens Schlegel & Müller, Verh. nat. gesch. Ned. overz. Bezitt. Zool. 1839—1841. Overzigt Amphiprion. etc. p. 24.
Glyphisodon angulatus Bleeker, Nat. Geneesk. Arch. Ned. Indië II (3), 1845, p. 523.
Heliases cinerascens Bleeker, Verh. Bat. Gen. XXI, 1847. Labr. cten. p. 31.
Heliastes cinerascens Günther, Cat. Brit. Mus. IV, 1862, p. 61.
Chromis insulindicus Bleeker, Versl. Akad. Amsterdam (2) X, 1877, p. 390. — Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 154 — Atl. Ichth. IX, 1877. Tab. 403, fig. 3.
Chromis cinerascens Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 155. — Atl. Ichth. IX, 1877. Tab. 407, fig. 1.
Heliastes cinerascens Sauvage, Poissons de Madagascar, 1891, p. 436.
Chromis cinerascens Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 54.

D. XIII. 10 (11) (rarely XIV. 9 (10)). A. II. 10 (11). P. 2. 17. V. I. 5. Ll. 18 + 8. Ltr. $\dfrac{2\frac{1}{2}}{\dfrac{1}{8}}$. Sq. l. 26.

Height 2.2, 2.9 in length with caudal. Head 3.4, 4.4 in length with caudal. Length of head 1.1 in its height. Eye 3.4, 1.2 in convex interorbital space. Snout three fourths of eye. Preorbital with a shallow notch posteriorly, with one row of scales. Suborbital also scaly, the scales covering the lower edge of the bone. Three transverse rows of scales on preopercle. A narrow posterior, and posterior part of a narrow inferior limb, naked. Hindborder of preopercle rugose. Mouth oblique. Maxillary reaching a little behind vertical through frontborder of eye. Teeth conical, pointed, in several rows, the teeth of the outer row enlarged. Scales on upper part of head reaching to between nostrils. First dorsal spine less than eye, following increasing in length to the 6th—8th spines, which are longest and equal to snout and eye together. Posterior spines slightly shorter. Soft dorsal rounded, median rays longest, about equal to head without snout. First anal spine a little less than half length of second, which equals distance between hindborder of opercle and hindborder of pupil. Soft anal rounded behind, the first ray somewhat longer than the second spine. Ventrals with the first ray filamentous, as long as head. Pectorals slightly longer. Caudal deeply forked, the lobes pointed. Colour of preserved specimen uniform yellowish brown. (Description made after a specimen of 120 mm length from Bleeker's collection in the Amsterdam Museum). Length 121 mm.

Nomen indig. Betok laut, Gemutu (Malay, Batavia).

Habitat: Sumatra (Padang); Java (Batavia); Duizend Islands, Celebes (Makassar); Ceram; Ambon; Timor. — Madagascar, Réunion, Philippines. In sea.

Note. Fowler & Bean who examined a large number of specimens, came to the conclusion that the variation of their series of *cinerascens* exceed the variant Bleeker attempted to establish as *Chr. insulindicus.*

8. **Chromis ternatensis** (Blkr.)

Heliases ternatensis Bleeker, Nat. Tijdschr. Ned. Indië X, 1856, p. 377.
Heliastes ternatensis Günther, Cat. Brit. Mus. IV, 1862, p. 63.
Heliases amboinensis Bleeker, Ned. Tijdschr. Dierk. IV, 1871, p. 111.
Chromis ternatensis Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 161. — Atl. Ichth. IX, 1877. Tab. 403, fig. 4.
Chromis amboinensis Bleeker, ibid. p. 162. — ibid. Tab. 403, fig. 8.
Chromis philippinus Fowler, Proc. Acad. Nat. Sc. Philadelphia LXX, 1918, p. 63.
Chromis ternatensis Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 32.
Chromis ternatensis Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 31.
Chromis amboinensis Fowler & Bean, ibid. p. 35.
?*Chromis atripes* Fowler & Bean, ibid. p. 43.
Chromis ternatensis Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 307.

D. XII. 10. A. II. 11. P. 2. 14. V. I. 5. Ll. 17 + 10. Ltr. $\begin{array}{c}1\frac{1}{2}\\ \hline 1\\ \hline 8\end{array}$. Sq. l. 26—27.

Height about 2, 2.5 in length with caudal. Head 3.3, 4.3 in length with caudal. Length of head 1.4 in its height. Eye 3.1, equal to snout and to convex interorbital space. Mouth very oblique. Maxillary reaching to below nostril. Teeth conical, in a few rows, those of the outer series much larger than the others. Preorbital much deeper than suborbital, the lower edge of which is covered by the scales, which are arranged in one transverse row on this bone. Two transverse rows of scales on preopercle, and one row on inferior limb. Posterior limb scaly. Hindborder of preopercle smooth. Scales on upper part of head reaching to end of snout. Middle dorsal spines longest, equal to postorbital part of head. Soft dorsal pointed, higher than spinous part, the longest rays equal to head without snout. First anal spine less than half length of second, which is equal to postorbital part of head. Soft anal rather pointed, slightly less deep than soft dorsal. Ventrals with the first ray produced into a filament, slightly less than head. Pectorals longer than head. Caudal forked, the lobes pointed and more or less filamentous. Colour of preserved specimens brownish, lighter below and on sides of head. An ill defined brown spot superiorly at base of pectoral. Spinous dorsal dark, soft dorsal and anal lighter. Caudal yellowish, the upper and the lower lobe dark brown. Pectorals and ventrals brownish. Length 144 mm.

Habitat: Danawan Island and Si Amil Island, Bina Birahan Island, off Borneo; Celebes (Gulf of Tomini, Gulf of Boni, Libani Bay); Sangi Islands; Sulu Islands; Flores; Timor; Ternate; Maitara; Tidore; Makian; Halmahera; Doworra Island; Gomomo Island; Buru; Obi major; Ambon; Goram; Aru Islands; New Guinea (Manokwari). — Philippines, Solomon Islands, New Hebrides, Samoa. In sea.

Note. I have united *amboinensis* with *ternatensis*. Montalban already doubted the validity of lastnamed species, but Fowler & Bean, who had a very large material, keep them apart. According to Bleeker *amboinensis* has a more parabolic profile, 12 dorsal rays, and the end of the lateral line below the spinous dorsal and not below the soft dorsal, as in *ternatensis*. The specimens described by Fowler & Bean as *ternatensis* have the parabolic profile of *amboinensis*, but 10 to 11 dorsal rays, whereas their specimens of *amboinensis* have 11 to 12 dorsal rays. I agree with Montalban that there is hardly any difference between the two species. *Chr. atripes* Fowl. & Bean may be a valid species, with 12 to 13 dorsal rays and slightly different colour, the anterior part of the soft dorsal, and of the soft anal, as well as the ventrals, being dark.

The fish recorded by Weber, Siboga Exp. Fische 1913, p. 359, although with a query, as *ternatensis,* is certainly not this species. It has D. XIII. 12, and numerous blue spots on head and sides of body, which is much more slender than in *ternatensis.* I am unable to identify it.

9. **Chromis dimidiatus** (Klunz.)

Heliastes dimidiatus Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 529.
Heliastes dimidiatus Günther, Fische der Südsee II, 1881, p. 237.
Glyphidodon bicolor Macleay, Proc. Linn. Soc. New S. Wales VII, 1882, p. 365.
Chromis leucurus Gilbert, Bull. U. S. Fish. Comm. XXIII, Part II (1903) 1905, p. 620.
Chromis xanthurus Barnard, Ann. S. Afric. Mus. XXI, 1925—1927, p. 732 (nec Blkr.).
Chromis dimidiatus Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 33.
Chromis dimidiatus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 45.
Chromis dimidiatus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 308.

D. XII. 12. A. II. 12. P. 2. 13. V. I. 5. Ll. 17 + 8. Ltr. $\begin{array}{c}2\frac{1}{2}\\ \hline 1\\ \hline 7\end{array}$. Sq. l. 26.

Height 2.1, 2.8 in length with caudal. Head 3.4, 4.6 in length with caudal. Length of head 1.3 in its height. Eye 2.9, slightly more than convex interorbital space. Snout 1.8 in eye. Mouth oblique. Maxillary reaching to below frontborder of eye. Teeth conical, in several rows, those of the outer row much enlarged. Preorbital not much deeper than suborbital, both bones covered with one row of scales. Anteriorly 3, posteriorly 2 transverse rows of scales on preopercle and one row on inferior limb. Posterior limb scaly. Hindborder of preopercle smooth. Scales on upper part of head reaching to end of snout. Fifth and sixth dorsal spines longest, equal to eye and snout together. Soft dorsal somewhat pointed, the longest rays equal to head without snout. First anal spine less than half length of second, which is equal to snout and eye and shorter than first anal ray. Post median anal rays longest, equal to head without snout. Pectorals equal to head, much shorter than ventrals, which have the first ray produced into a long filament reaching on anal. Caudal deeply forked, the lobes more or less filamentous. Colour of preserved specimen chocolate brown, but posterior part of soft dorsal and anal, caudal peduncle, and caudal, white; the two colours sharply defined. A bluish grey stripe below eye on suborbital. Spinous dorsal and base of soft dorsal chocolate brown, much darker towards the edge of the fin. Anterior part of anal dark brown. Axil of pectoral deep brown, as also the base of the fin, followed by white and gradually becoming brown distally. Ventrals very deep brown. Length 112 mm.

Habitat: Danawan Island and Si Amil Island, off Borneo; Sulu Islands; Celebes (Gulf of Boni, Libani Bay, Gulf of Tomini); Maitara; Tidore; Makian; Doworra Island; Sula Islands!; Buru; New Guinea (Port Moresby). — Coast of Natal, Red Sea, Philippines, New Hebrides, Samoa, Society Islands, Hawaii. In sea.

10. **Chromis retrofasciatus** M. Web.

Chromis retrofasciatus M. Weber, Siboga Exp. Fische 1913, p. 359.
Chromis retrofasciatus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 53.

D. XII. 12. A. II. 12. Sq. l. 26—27. Ltr. $\begin{array}{c}3\\\hline 1\\\hline 9\end{array}$.

Heigth 2.5 in length with caudal. Head 4 in length with caudal. Eye 2.2. Scales on upper part of head reaching to beyond nostrils. Preorbital and suborbital scaly, the first emarginate. Preopercle smooth posteriorly. Two to three transverse rows of scales on preopercle and one row on inferior limb. Posterior limb scaly. Teeth of the outer row in both jaws pointed and distant, the much smaller ones of the inner rows almost between them. Middle dorsal spines longest, the membranes between the spines deeply incised. Second anal spine more than half length of head. Caudal emarginate. Colour of preserved specimen yellowish brown; back darker, especially from origin of dorsal to interorbital space. A chocolate brown transverse band on posterior part of body and anterior part of caudal peduncle continued upwards on anterior part of soft dorsal and downwards on posterior part of anal. Fins otherwise yellowish grey, edge of spinous dorsal dark. Length 47 mm.

Habitat: Danawan Island and Si Amil Island, off Borneo; Sulu Islands; Celebes (Gulf of Boni, Gulf of Tomini); Makian; Halmahera; Kur!. — Philippines. In sea.

9. **Dascyllus** Cuvier

(Cuvier, Règne Animal, Ed. II, II, 1829, p. 179)

Tetradrachmum Cantor, Journ. Asiat. Soc. Bengal XVIII (1849) 1850, p. 1223.
Pellochromis Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 13.

Orbicular. Mouth oblique or very oblique. Snout short. Teeth conical and pointed, in several rows, the teeth of the outer row enlarged. Preorbital and suborbital scaly, their lower border denticulated. Hindborder and lower border of preopercle denticulated. Scales large. Posterior part of lateral line on caudal peduncle often with tubes in stead of pores. Vertical fins with well developed scaly sheaths. Dorsal with XII strong spines and 12—15 (16) rays. Anal with II strong spines and 12—15 rays. Caudal emarginate or slightly forked.

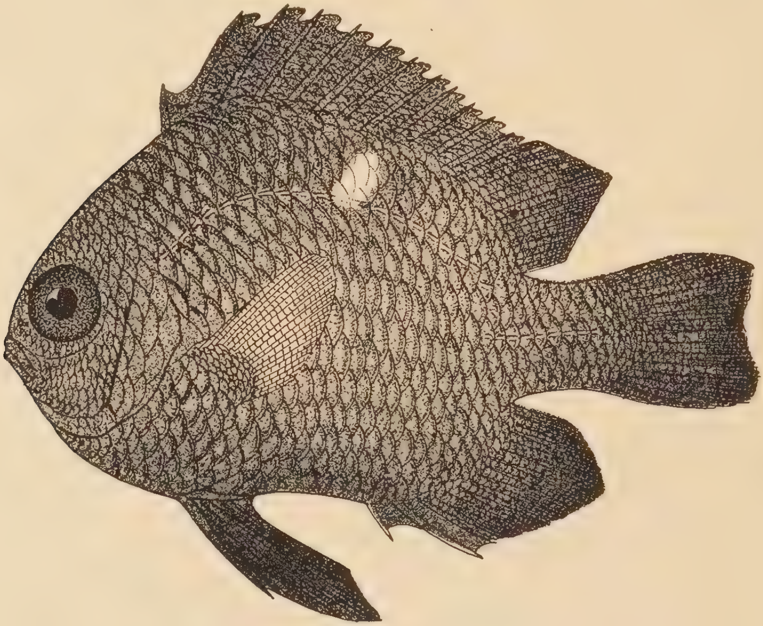
Fig. 53. *Dascyllus trimaculatus* (Rüpp.) × 2

Distribution. Tropical and subtropical parts of Pacific, Indic, and the Red Sea.

Key to the Indo-australian species of Dascyllus

A. Second and third dorsal spines subequal.
  a. Caudal slightly emarginate. 4—5 rows of scales on preopercle, and one on inferior limb. A white blotch in lateral line below spinous dorsal generally present. Young not banded and with a white blotch on nape . . . . . . 1. *D. trimaculatus* p. 463.

b. Caudal slightly forked. 3—4 rows of scales on preopercle and one on inferior limb. Colour uniform, young ones with two transverse dark bands . . . . 2. *D. marginatus* p. 465.

B. Second dorsal spine two thirds length of third spine. Light with three transverse dark bands.

a. Second band running obliquely from middle of spinous dorsal down to base of pectoral, and then vertically to base of ventral. Caudal light or dusky . . . . 3. *D. aruanus* p. 467.

b. Second band running vertically from anterior part of spinous dorsal down to base of pectoral and ventral. Caudal dark distally . . . . . . 4. *D. melanurus* p. 469.

1. **Dascyllus trimaculatus** (Rüpp.). (Fig. 53, p. 462)

Pomacentrus trimaculatus Rüppell, Atlas Reise N. Afrika. Fische, 1828, p. 39.

Pomacentrus nuchalis Bennett, in Life of Raffles, 1830, p. 688.

Dascyllus trimaculatus Cuvier & Valenciennes, Hist. Nat. Poissons V, 1830, p. 441.

Dascyllus trimaculatus Schlegel & Müller, Verh. nat. gesch. Ned. overz. Bezitt. Zool. 1839—1841. Overzigt Amphiprion, etc. p. 22.

Dascyllus niger Bleeker, Verh. Bat. Gen. XXI, 1847. Labr. cten., p. 10.

Dascyllus trimaculatus Günther, Cat. Brit. Mus. IV, 1862, p. 13.

Tetradrachmum trimaculatum Bleeker, Ned. Tijdschr. Dierk. II, 1865, p. 145.

Dascyllus trimaculatus Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 519.

Tetradrachmum trimaculatum Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, Nº 6, 1877, p. 144. — Atl. Ichth. IX, 1877. Tab. 409, fig. 8.

Dascyllus trimaculatus Günther, Fische der Südsee II, 1881, p. 236.

Tetradrachmum trimaculatum Day, Fishes of India, Suppl. 1888, p. 801.

Dascyllus trimaculatus Steindachner, Denkschr. Akad. Wien LXX, 1900, p. 503.

Tetradrachmum trimaculatum Steindachner, Abh. Senckenb. naturf. Ges. XXV, 1901, p. 439.

Dascyllus trimaculatus Jordan & Seale, Bull. Bur. Fish. XXV (1905) 1906, p. 290. — ibid. XXVI (1906) 1907, p. 27.

Tetradrachmum trimaculatum M. Weber, Siboga Exp. Fische 1913, p. 356.

Dascyllus trimaculatus Barnard, Ann. S. Afric. Mus. XXI, 1925—1927, p. 731.

Dascyllus trimaculatus Ahl, Blätter f. Aquarien- und Terrarienkunde 38, Heft 3. 1937.

Dascyllus trimaculatus Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 23.

Dascyllus trimaculatus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 14.

Dascyllus trimaculatus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 305.

Dascyllus trimaculatus Duncker & Mohr, Mitt. Zool. Staatsinst. und Zool. Mus. Hamburg, XLIV, 1929, p. 67.

Pellochromis trimaculatus Whitley, Mem. Queensl. Mus. IX, Part III, 1929, p. 246.

D. XII. 15 (16). A. II. 14—15. P. 2.16—18. V. I. 5. Ll. 17—20+8. Ltr. $\begin{array}{c} 3-3\frac{1}{2} \\ \hline 1 \\ \hline 10-11 \end{array}$. Sq. l. 28—29.

Height 1.5, 1.9—2 in length with caudal. Head 3—3.3, 4.1—4.3 in length with caudal. Length of head 1.6—1.7 in its height. Eye 2.4—3.1, equal to or somewhat more or less than very convex interorbital space. Snout very short, much less than eye. Mouth very oblique. Maxillary almost reaching to below frontborder of eye. Teeth conical, in several rows, those of the outer series, especially near symphysis much larger. Preorbital and suborbital with a row of elongate scales, the lower borders of these bones finely denticulated. 4—5 irregular rows of scales on preopercle and one on inferior limb. A narrow posterior limb naked. Hindborder of preopercle with minute denticulations. Scales on upper part of head reaching to end of snout, those before eyes much smaller than the others. First dorsal spine short. Second or third and fourth dorsal spines slightly longer than the others, almost as long as head without snout. Soft dorsal bluntly pointed, the first rays as long as last spines, the middle rays as long as longest dorsal spines. First anal spine short, second as long as longest dorsal spines. Soft anal similar to soft dorsal. Pectorals and ventrals subequal, longer than head. Caudal very slightly emarginate. Colour of preserved specimens light or dark brown, the scales with a darker hindborder. A blackish blotch at base of pectoral superiorly, generally present. In young a chalky white patch on nape and another in lateral line below 7th or 8th dorsal spines. The patch on nape disappears in adults, that on sides remains often. Distal half of spinous dorsal, soft anal, caudal, and ventrals generally very dark. Caudal sometimes lighter, the median rays dark. Sometimes the posterior dorsal rays are white in their distal half. Pectorals dusky or hyaline. Length 140 mm.

Habitat: Pulu Weh!; Sumatra (Benkulen, Padang); Nias; Java (Batavia); Danawan Island and Si Amil Island, off Borneo; Sulu Islands; Celebes (Makassar!, Menado, Gulf of Boni, Gulf of Tomini); Bali; Buru; Batjan; Tidore; Makian; Halmahera; Ambon!; Haruko; Ceram; Lucipara Islands!; Banda!; New Guinea (Manokwari, Atjatuning!, Port Moresby). — Coast of Natal, Mozambique, Zanzibar, Red Sea, Arabian Sea, Mauritius, Ceylon, Philippines, Pelew Islands, Yap, Marshall Islands, Marcus Island, Admiralty Islands, Louisade Archipelago, Coast of Queensland, New Hebrides, Fiji, Samoa, Kingsmill Islands, Society Islands, Hawaii. In sea.

2. **Dascyllus marginatus** (Rüpp.), (Fig. 54, p. 466)

Pomacentrus marginatus Rüppell, Atlas Reise N. Afrika. Fische 1828, p. 38.
Dascyllus marginatus Cuvier & Valenciennes, Hist. Nat. Poissons V, 1830, p. 439.
Heliases reticulatus Richardson, Rep. Brit. Ass. Adv. Sc. (1845) 1846. Ichth. China, p. 254.
Dascyllus xanthosoma Bleeker, Nat. Tijdschr. Ned. Indië II, 1851, p. 247.
Dascyllus marginatus Steindachner, Verh. zool. bot. Ges. Wien XI, 1861, p. 77.
Dascyllus marginatus Günther, Cat. Brit. Mus. IV, 1862, p. 14.
Dascyllus xanthosoma Günther, l.c.
Tetradrachmum xanthosoma Bleeker, Ned. Tijdschr. Dierk. II, 1865, p. 145.
Dascyllus marginatus Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 520.
Tetradrachmum reticulatum Bleeker, Ned. Tijdschr. Dierk. IV (1871) 1872, p. 135.
Dascyllus reticulatus Cartier, Verh. phys. med. Ges. Würzburg V, 1874, p. 97.
Tetradrachmum reticulatum Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 145. — Atl. Ichth. IX, 1877. Tab. 409, fig. 3.
Tetradrachmum marginatum Day, Fishes of India, Part III, 1877, p. 381.
Dascyllus xanthosoma Günther, Fische der Südsee II, 1881, p. 237.
Dascyllus marginatus Sauvage, Poissons de Madagascar, 1891, p. 422.
Tetradrachmum reticulatum Steindachner, Abh. Senckenb. naturf. Ges. XXV, 1901, p. 439.
Tetradrachmum reticulatum M. Weber, Siboga Exp. Fische 1913, p. 356.
Dascyllus marginatus Barnard, Ann. S. Afric. Mus. XXI, 1925—1927, p. 731.
Tetradrachmum xanthosoma Whitley, Rec. Austr. Mus. XVI, 1927, p. 23.
Dascyllus marginatus Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 24.
Dascyllus marginatus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 17.
Dascyllus marginatus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 306.
Pellochromis xanthosoma Whitley, Mem. Queensl. Mus. IX, Part III, 1929, p. 246.

D. XII. 15. A. II. 14. P. 2.18. V. I. 5. Ll. 18+8. Ltr. $\begin{array}{c}3\\ \hline 1\\ \hline 10-11\end{array}$. Sq. l. 28.

Height 1.6, 2 in length with caudal. Head 3.1, 3.9 in length with caudal. Length of head 1.5—1.6 in its height. Eye 2.7, about equal to convex interorbital space. Mouth very oblique. Maxillary reaching almost to below frontborder of eye. Snout very short, much less than eye. Teeth conical, in several series, those of the outer row much larger. Preorbital and suborbital covered with elongate scales. Lower border of both fins finely denticulated. 3—4 transverse rows of scales on preopercle and one on inferior limb. Posterior limb naked. Hindborder and lower border of preopercle rather coarsely denticulated. Scales on upper part of head reaching to end of snout, those before eye much smaller than the others. First dorsal spine short. Second, third, and fourth spines subequal, somewhat longer than the following and almost as long as head without snout. Soft dorsal bluntly pointed, the first ray as long as last spine, the longest rays equal to the longest dorsal spines. First anal spine short, second as long as longest dorsal spines. Soft anal similar to soft dorsal. Pectorals and ventrals subequal, slightly longer than head. Caudal distinctly emarginate or slightly forked. Colour brown, the scales with a dark hindborder. A blackish blotch superiorly at base of pectoral generally present. Lips blackish. In young ones, 14 mm long, there are two almost black transverse bands, one from anterior part of spinous dorsal and a second from soft dorsal to soft anal, both bands more or less connected through the dark edge of the dorsal. In older ones first the posterior and then the anterior band gradually fade and disappear. Fins dark, especially the soft anal, and ventrals. Length 140 mm.

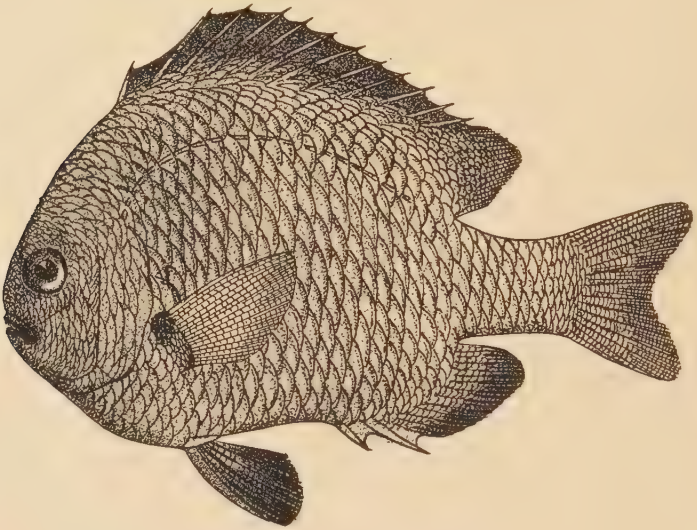

Fig. 54. *Dascyllus marginatus* (Rüpp.) n.s.

Habitat: Nias; Borneo; Danawan Island and Si Amil Island, off Borneo; Sulu Islands; Borneo Bank!; Buru; Ceram; Ternate; Maitara; Tidore; Makian; Halmahera; Damar!; Ambon!; Goram; Banda; New Guinea (Manokwari, Port Moresby). — Mozambique, Zanzibar, Mauritius, Réunion, Red Sea, Arabian Sea, Andamans, China, Philippines, Ponapé, New Britain, Coast of Queensland, New Hebrides, Fiji, Rotuma, Hawaii. In sea.

3. **Dascyllus aruanus** (L.)

Chaetodon aruanus Linné, Syst. Nat. ed. 10. 1758, p. 275.
Chaetodon aruanus Bloch, Naturgesch. Ausländ. Fische III, 1787, p. 62.
Lutjanus aruanus Lacepède, Hist. Nat. Poissons IV, 1803, p. 719, p. 720.
Pomacentrus aruanus Rüppell, Atlas Reise N. Afrika, Fische. 1828, p. 39.
Dascyllus aruanus Cuvier & Valenciennes, Hist. Nat. Poissons V, 1830, p. 434.
Tetradrachmum arcuatum Cantor, Journ. Asiat. Soc. Bengal XVIII, Part II (1849) 1850, p. 1223 (nec L.).
Dascyllus aruanus Bleeker, Nat. Tijdschr. Ned. Indië VI, 1854, p. 108.
Dascyllus aruanus Günther, Cat. Brit. Mus. IV, 1862, p. 12.
Tetradrachmum aruanum Bleeker, Ned. Tijdschr. Dierk. I, 1863, p. 231.
Dascyllus aruanus Kner, Novara Exp. Fische I, 1865, p. 241.
Dascyllus aruanus Klunzinger, Verh. zool. bot. Ges. Wien XXI, 1871, p. 519.
Dascyllus aruanus Kossmann & Räuber, Verh. Naturh. Med. Ver. Heidelberg I, 1876, p. 32.
Tetradrachmum arcuatum Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 147. — Atl. Ichth. IX, 1877. Tab. 409, fig. 6.
Tetradrachmum aruanum Day, Fishes of India, Part III, 1877, p. 381.
Dascyllus aruanus Günther, Fische der Südsee II, 1881, p. 235.
Dascyllus aruanus Macleay, Descr. Cat. Austr. Fish. II, 1881, p. 61.
Dascyllus aruanus Jatzow & Lenz, Abh. Senckenb. naturf. Ges. XXI, 1899, p. 517.
Dascyllus aruanus Jordan & Seale, Bull. Bur. Fish. XXV (1905) 1906, p. 290. — ibid. XXVI (1906) 1907, p. 27.
Dascyllus aruanus McCulloch, Rec. Austr. Mus. IX, N⁰ 3, 1913, p. 360.
Dascyllus aruanus Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 21.
Dascyllus aruanus Ahl, Blätter f. Aquarien- und Terrarienkunde 39, 1928, Heft 3.
Dascyllus aruanus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 21.
Dascyllus aruanus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 307.
Tetradrachmum aruanum Whitley, Mem. Queensl. Mus. IX, Part III, 1929, p. 245.

D. XII. 12—13. A. II. 12. P. 2. 15—17. V. I. 5. Ll. 17+8. Ltr. $\begin{array}{c}2-2\frac{1}{2}\\ \hline 1\\ \hline 9\end{array}$. Sq. l. 24—26.

Height 1.6, 2—2.1 in length with caudal. Head 2.8—3.2, 3.4—4 in length with caudal. Length of head 1.4—1.6 in its height. Eye 2.7—3.2, more than snout and somewhat less than convex interorbital space. Mouth oblique. Maxillary reaching to below front-border of eye. Teeth conical, pointed, in several series, those of the outer row much enlarged. Preorbital deeper than suborbital, both bones covered with elongate scales and with the lower border distinctly denticulated. Three transverse rows of scales on preopercle and one on inferior limb. A narrow posterior limb naked. Lower border and hindborder of preopercle distinctly serrated. Scales on upper part of head reaching to end of snout, those before eyes much smaller than the others. First dorsal spine slightly more than half length of second, which is two thirds of the third spine. Following spines slightly increasing in length to the sixth spine, which is longest and equal to snout and eye together. Soft dorsal pointed, the longest rays as long as the longest spines. First anal spine half length of second, which is slightly less than longest dorsal spine. Soft anal similar to soft dorsal, but a little less pointed. Pectorals and ventrals subequal, as long as head. Caudal forked, the lobes slightly pointed. Colour of preserved specimens pearly white or brownish, with three dark brown transverse bands; the first from nape obliquely downwards through eye to chin, leaving the snout of a light colour. Second from 5th or 6th to 9th dorsal spines obliquely downwards to pectorals and from there in a more vertical direction to base of ventrals. Third band vertical, from posterior dorsal spines and soft dorsal to anal, which is of the same dark colour. Distal part of posterior dorsal rays light. Spinous dorsal with a dark edge, connecting the second and third bands. Pectorals light, dark at base. Ventrals dark. Caudal light, sometimes dusky. Length 82 mm.

Habitat: Sumatra (Benkulen, Ulakan, Priaman, Padang!, Batu Sangkar); Simalur!; Batu Islands; Nias; Bawean; Danawan Island and Si Amil Island, off Borneo; Sulu Islands!; Sangi Islands; Borneo Bank! Muaras Reef!; Kanjungan Ketjil!; Sebangkatan!; Saleyer!; Paternoster Islands!; de Bril!; Celebes (Labuandata Bay, Menado); Bali; Flores!; Lomblen!; Sumbawa; Sumba!; Solor; Timor; Buru; Ambon!; Haruko; Ceram; Obi major; Batjan; Ternate; Halmahera; Salomakië!; Goram; Gébé; Kei Islands!; Aru Islands; Waigeu! Schouten Islands; New Guinea (Manokwari, Port Moresby). — Madagascar, Aldabra, Mozambique, Zanzibar, Red Sea, Mauritius, Réunion, Maldives, Ceylon, Coasts of British India and of Burma, Andamans, Nicobars, Cocos Keeling Islands, China, Pinang, Philippines, Pelew Islands, Marianas, Marshall Islands, Carolines, Solomon Islands, Woodlark Island, New Hebrides, Murray Island, Coast of Queensland, New Zealand, Kingsmill Islands, Funafuti, Rotuma, Fiji, Samoa, Tonga Islands, Society Islands, Paumotu Islands, Marquesas Islands, Palmyra. In sea, living on reefs among and in corals.

4. **Dascyllus melanurus** Blkr.

Dascyllus aruanus var. Schlegel & Müller. Verh. nat. gesch. Ned. overz. Bezitt. Zool. 1839—1841. Overzigt Amphiprion, etc. p. 21.
Dascyllus aruanus var. a. Bleeker, Nat. Tijdschr. Ned. Indië II, 1851, p. 246.
Dascyllus melanurus Bleeker, ibid. VI, 1854, p. 109.
Dascyllus melanurus Günther, Cat. Brit. Mus. IV, 1862, p. 12.
Tetradrachmum melanurus Bleeker, Ned. Tijdschr. Dierk. I, 1863, p. 231. — Verh. Holl. Maatsch. Wetensch. (3) II, 1877, N⁰ 6, p. 149. — Atl. Ichth. IX, 1877. Tab. 409, fig. 1.
Dascyllus melanurus Günther, Fische der Südsee II, 1881, p. 236.
Pomacentrus onyx De Vis, Proc. Linn. Soc. New S. Wales VIII, 1883, p. 451.
Dascyllus melanurus Jordan & Richardson, Bull. Bur. Fish XXVII (1907) 1908, p. 265.
Dascyllus melanurus Montalban, Monogr. Bur. Sc. Manila XXIV, 1927, p. 20.
Dascyllus melanurus Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 20.
Dascyllus melanurus Fowler, Mem. B. P. Bishop Mus. X, 1928, p. 306.
Tetradrachmum melanurus Whitley, Mem. Queensl. Mus. IX, Part III, 1928, p. 217.

D. XII. 13. A. II. 13. P. 2.16. V. I. 5. Ll. 18+8. Ltr. $\begin{array}{c} 2\frac{1}{2} \\ \hline 1 \\ \hline 9 \end{array}$. Sq. l. 27.

Height 1.6, 2 in length with caudal. Head 3—3.1, 3.7—3.9 in length with caudal. Length of head 1.6—1.7 in its height. Eye 2.3—2.7, more than snout and equal to or somewhat less than convex interorbital space. Mouth oblique. Maxillary almost reaching to below frontborder of eye. Teeth conical, pointed, in several rows, those of the outer row enlarged. Preorbital deeper than suborbital, and covered with one row of elongate scales. Suborbital with one row of scales. Both bones strongly denticulated below. Three transverse rows of scales on preopercle and one on inferior limb. A narrow posterior limb naked. Lower border and hindborder of preopercle strongly denticulated. Scales on upper part of head reaching to end of snout, the anterior scales smaller than the others. First anal spine about half length of second. Second spine two thirds of third. Third to fifth spines subequal, longer than the others, and equal to snout and eye together. Soft dorsal obtusely pointed, the longest rays scarcely longer than longest dorsal spines. First anal spine half length of second, which is somewhat shorter than third dorsal spine. Soft anal rounded, the longest rays equal to snout and eye together. Ventrals as long as head, pectorals slightly shorter. Caudal emarginate, the lobes rounded. Colour of preserved specimens pearly white or cream coloured, with three transverse dark brown bands. The first band from anterior part of nape and posterior part of interorbital space, through eye, to chin, leaving the snout of a light colour. Second band from anterior part of spinous dorsal, backwards to the fifth or sixth spines, almost vertically down through base of pectoral to base of ventrals, which are also dark. Third band from two posterior dorsal spines and soft part of dorsal down to, and on, anal. A broader hindborder of dorsal and a narrower hindborder of anal light. Distal part of caudal dark brown, but the outer upper and lower rays white or creamy as the rest of the fin. Pectorals light, with a dark base. Median part of dorsal between the two bands also light. Length 72 mm.

Habitat: Sumatra (Priaman, Ulakan); Bawean; Celebes (Menado, Gorontalo); Borneo Bank!; Sumbawa; Flores; Timor; Obi major; Buru; Ambon!; Ceram; Goram; Banda; Gébé; Kei Islands!; New Guinea (Manokwari). — Maldives, Philippines, Yap, Ponapé, New Britain; Solomon Islands. In sea, on reefs, living in and among corals.

10. **Lepidozygus** Günther

(Günther, Cat. Brit. Mus. IV, 1862, p. 15).

Elongate, compressed, covered by rather large scales, 36 in a longitudinal series between gillopening and base of caudal. Mouth oblique, protractile. Teeth small, subconical, in a single series. Preorbital and suborbital without serrations, the edge of the suborbital hidden by scales. Hindborder of preopercle slightly serrated. Snout scaly. Dorsal consisting of XII spines and 14—15 rays.

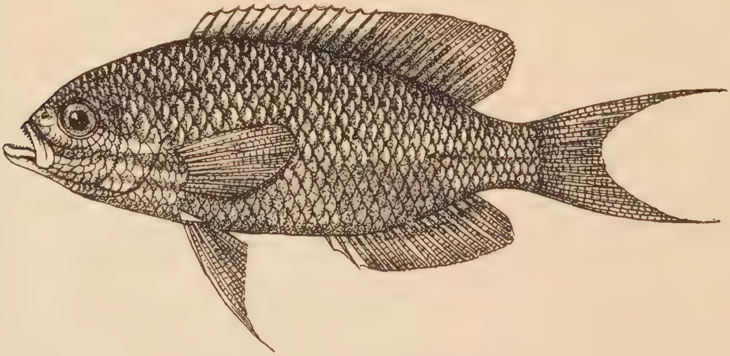

Fig. 55. *Lepidozygus tapeinosoma* (Blkr.) after Bleeker.

Anal with II spines and 15—17 rays. Pectorals rounded, ventrals pointed. Caudal forked.

Distribution that of the single species known.

1. **Lepidozygus tapeinosoma** (Blkr.)

Pomacentrus tapeinosoma Bleeker, Nat. Tijdschr. Ned. Indië X, 1855, p. 376.
Lepidozygus tapeinosoma Günther, Cat. Brit. Mus. IV, 1862, p. 15.
Lepidozygus tapeinosoma Bleeker, Verh. Holl. Maatsch. Wetensch. (3) II, N⁰ 6, 1877, p. 71. — Atl. Ichth. IX, 1877. Tab. 404, fig. 1.
Lepidozygus tapeinosoma Fowler & Bean, Bull. U. S. Nat. Mus. 100. Vol. VII, 1928, p. 25.

D. XII. 14—15. A. II. 15—17. P. 2. 19—20. V. I. 5. Sq. l. 36.

Height 2.4—2.7. Head 3.5—3.6. Eye 3.8—4.2, 1—1.2 in snout and 1.4—1.5 in convex interorbital space. Mouth oblique. Maxillary reaching to below frontborder of eye. Scales on upper part of head reaching to between nostrils. Preorbital without scales. Suborbital scaly posteriorly. Five to six transverse rows of scales on preopercle. The last 8 dorsal spines are subequal and somewhat longer than the others. Soft dorsal obtusely rounded, slightly higher than spinous part. Second anal spine slightly longer than eye. Soft anal similar to soft dorsal. Pectorals and ventrals equal to or slightly shorter than head. Caudal deeply forked, the lobes pointed. Colour of preserved specimens olive above, under surface of head and abdomen soiled whitish. Most scales about humeral region with dark or neutral tint, sometimes as spot basally. Below eye towards pectoral base and parallel with lower front profile of body at least 3 poorly defined gray white streaks extending to thorax. Dorsal and anal dusky neutral. Caudal olive. Paired fins dull or light olive, usualy with a dark spot in pectoral axil (Compiled, a specimen in rather poor condition from Bleeker's collection in the Amsterdam Museum seen by me).

Habitat: Buru; Ternate!; Tidore; Doworra Island; Ambon. — Philippines. In sea.

Zabulon Whitley

(Whitley, Rec. Austr. Mus. XVI, N⁰ 6, 1928, p. 296)

Oblong. Head and body covered with ctenoid scales. The lateral line pierces two or three scales behind the head, is then interrupted, and proceeds close to the base of the dorsal fin, at the end of which it stops. Dorsal with XI spines and 8 soft rays. Anal with III spines and 8 soft rays. Caudal subtruncated.

Distribution that of the single species known.

Zabulon roseus (Gthr.) (Fig. 56, p. 472)

Heliastes roseus Günther, Rep. Challenger. Zool. I, Part VI, 1880, p. 45.
Zabulon roseus Whitley, Rec. Austr. Mus. XVI, N⁰ 6, 1928, p. 296.

D. XI. 8. A. III. 8. Sq. l. 26. Ltr. $\frac{\frac{1}{1}}{10}$.

Height 2.7, head 3. Eye very large, scarcely two fifths of the length of the head. Snout extremely short, with the cleft of the mouth very oblique; maxillary narrow, not extending to below the middle of the eye. Pectoral with a broad base extending to the origin of the anal fin. Scales very finely ciliated. Uniform rose coloured. Length 87 mm. (After Günther, not seen by me).

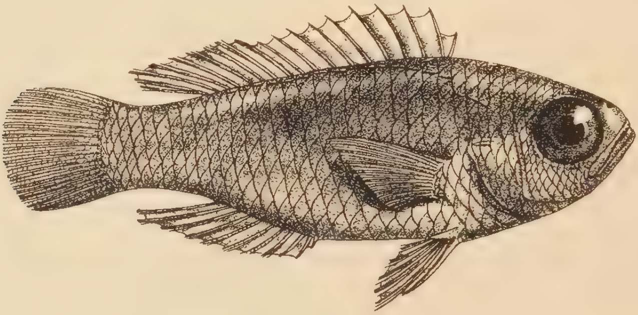

Fig. 56. *Zabulon roseus* (Gthr.) after Günther

Habitat: Off Kei Islands, 129 fathoms.

Note. Whitley l.c. rightly remarks, that *Heliastes roseus* differs in too many respects to keep it in that genus. He therefore proposed to make it the type of a new genus. The description of this species by Günther is too short to get an opinion about the place of it among the other members of the *Pomacentridae* and when the dentition and other characters will be known it might well be that it has to be removed altogether from this family.

ALPHABETICAL INDEX

OF

VERNACULAR NAMES[1]

Bajam 44
Batu 41
Beru-beru 135
Betok laut 416, 417, 458
Betok laut hitam 425
Betok laut kuning 419
Carava 300
Chaul-chaul 121, 124, 198
Chaul-chaul salah 128
Chaul-chaul taréh vabah 192
Chaul-chaul valah 114
Dava-dava 35
Déan-déa 83
Gagarim 89
Gemutu 416, 458
Gigi andjing 33
Gira-gira 248
Kakatua 81, 89
Kakatua Sumpit 74
Kodja 204, 234
Koko-koko 260
Laheta 372
Lamèlulvau 83
Lamoru 135
Maming 81, 89
Mandela 135
Meiningo 89
Naitahe 288
Nila-nila 135
Niiti 299
Nuri-nuri 78, 81, 89
Rodu 429
Sajang-sajang 417
Semetjo 41
Tagih utang 74
Toka 45
Udu 135

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[1] As in Java the three languages: javanese, sundanese and malay are spoken, we have accordingly placed behind the indigenous names (Malay.), (Sundan.) or (Javan.). In naming a fish the malay people use as a rule "ikan" = fish before the special name. In most cases we have omitted "ikan".

ALPHABETICAL INDEX

OF

GENERA AND SPECIES

abacurus, Callyodon 311
abacurus, Pseudoscarus 311
abacurus, Scarus 311
Abudefduf 327, 380, 393, 414, 430
Abudefduf albofasciatus 399, 434, 443
Abudefduf amabilis 434
Abudefduf amboinensis 451
Abudefduf anabatoides 396, 412
Abudefduf antjerius 437
Abudefduf assimilis 398, 431
Abudefduf aureus 396, 418
Abudefduf azureopunctatus 445
Abudefduf azysron 397, 425
Abudefduf bankieri 396, 411
Abudefduf batjanensis 399, 444
Abudefduf behni 397, 422
Abudefduf bengalensis 395, 403
Abudefduf bimaculatus 399, 445
Abudefduf biocellatus 398, 436
Abudefduf bleekeri 398, 431, 433
Abudefduf bonang 397, 420
Abudefduf brownriggi 436
Abudefduf Brownriggii 437
Abudefduf Brownriggii, var. zonatus 437
Abudefduf clarki 408
Abudefduf coelestinus 395, 409
Abudefduf curacao 396, 414, 418
Abudefduf curacau 415
Abudefduf cyaneus 398, 432, 434
Abudefduf dicki 442
Abudefduf dickii 399, 442
? Abudefduf filamentosus 413
Abudefduf filifer 396, 419
Abudefduf glaucus 437
Abudefduf hedleyi 433
Abudefduf hemicyaneus 398, 430, 434
Abudefduf jordani 447
Abudefduf lacrymatus 399, 439
Abudefduf leucogaster 396, 416
Abudefduf leucozona 399, 440
Abudefduf leucozonus 441
Abudefduf marginatus 407
Abudefduf melanopselion 429
Abudefduf melanopus 397, 422
Abudefduf melas 397, 424
? Abudefduf metallicus 413
Abudefduf modestus 437
Abudefduf notatus 395, 408
Abudefduf oxycephalus 397, 426
Abudefduf oxyodon 397, 428
Abudefduf pallidus 446
Abudefduf parasema 430
Abudefduf philippinus 414
Abudefduf plagiometopon 398, 424, 428
Abudefduf sapphirus 430, 432
? Abudefduf saxatilis 401, 403, 405, 410
Abudefduf saxatilis saxatilis 405, 408
Abudefduf saxatilis vaigiensis 395, 404, 408
Abudefduf septemfasciatus 395, 401
Abudefduf sexfasciatus 403, 405, 410
Abudefduf sordidus 395, 399
Abudefduf ternatensis 415
Abudefduf thoracotaeniatus 396, 420
Abudefduf unimaculatus 437
Abudefduf xanthonotus 397, 426

Abudefduf xanthozona 398, 434, 444
Abudefduf xanthurus 422
Abudefduf zonatus 437
Acanthochromis 327, 446
Acanthochromis brevipinnis 447
Acanthochromis longicaudis 447
Acanthochromis maculosus 447
Acanthochromis polyacanthus 447
Acanthocirrhitus oxycephalus 10
Acarauna longirostris 113
Actinicola 330
Actinicola bicolor 346
Actinicola percula 346
aculeata, Scorpaena 329
aeruginosus, Pseudoscarus 300, 302
aeruginosus, Scarus 300
affinis, Glyphidodon 403
akallopisos, Amphiprion 333
akallopisus, Amphiprion 331, 333
akallopisus, Phalerebus 333
akallopisus, Prochilus 333
albifasciatus, Brachypomacentrus 358
albifasciatus, Eupomacentrus 358
albifasciatus, Pomacentrus 358
albipunctatus, Callyodon 313
albofasciatus, Abudefduf 399, 434, 443
albofasciatus, Glyphidodontops 434
albofasciatus, Glyphisodon 443
albofasciatus, Pomacentrus 358, 372
albofasciatus var. of Pomacentrus scolopsis 358
albolineatus, Cossyphus 48
albovittata, Rhytejulis 160
albovittata, Stethojulis 156, 159
albovittatus, Labrus 159
altipinnis, Pseudoscarus 282
amabilis, Chrysiptera 434
amabilis, Glyphidodon 434
amabilis, Glyphidodontops 435
amblycephalus, Amblycirrhites 7
amblycephalus, Cirrhites 7
amblycephalus, Julis 136
amblycephalus, Paracirrhites 7
amblycephalus, Thalassoma 119, 136
Amblycirrhites 9
Amblycirrhites amblycephalus 7
Amblycirrhites arcatus 7
Amblycirrhitus indicus 10
Amblycirrhitus pantherinus 5
Amblyglyphidodon 393
Amblyglyphidodon aureus 418
Amblyglyphidodon curacao 415
Amblyglyphidodon leucogaster 416
Amblyglyphidodon ternatensis 414
Amblyglyphidodon trifasciatus 414
Amblypomacentrus 352
Amblypomacentrus breviceps 369
amboinensis, Abudefduf 451
amboinensis, Anampses 99, 103
amboinensis, Chromis 458
amboinensis, Duymaeria 140
amboinensis, Glyphidodon 361
amboinensis, Halichoeres 181, 223
amboinensis, Heliases 458
amboinensis, Julis 223
amboinensis, Platyglossus 223
amboinensis, Pomacentrus 355, 387
amboinensis, Pseudopomacentrus 387
Ampheces 98
Amphiprion 327, 330
Amphiprion akallopisos 333
Amphiprion akallopisus 331, 333
Amphiprion bicinctus 332, 338
Amphiprion bicolor 346
Amphiprion bifasciatus 341, 342
Amphiprion bifasciatus annamensis 342
Amphiprion boholensis 339
Amphiprion chrysargurus 338
Amphiprion chrysopterus 338
Amphiprion clarki 338
Amphiprion clarckii 338
Amphiprion Clarkii var. chrysargurus 339
Amphiprion Clarkii var. Japonicus 339
Amphiprion ephippium 332, 334, 337
Amphiprion ephippium var. bicinctus 339
Amphiprion ephippium var. chrysargurus 339
Amphiprion ephippium var. chrysopterus 339
Amphiprion ephippium var. clarkii 339
Amphiprion ephippium var. ephippium 335

Amphiprion ephippium var. melanopus 337
Amphiprion ephippium var. tricolor 335
Amphiprion ephippium var. xanthurus 339
? Amphiprion frenatus 334
Amphiprion intermedius 342
Amphiprion japonicus 338
Amphiprion laticlavius 342
Amphiprion macrostoma 335
Amphiprion melanopus 332, 337
Amphiprion melanurus 346
Amphiprion Milii 338
Amphiprion ocellaris 346
Amphiprion Papuensis 339
Amphiprion percula 331, 332, 345, 348
Amphiprion perideraeus 332
Amphiprion perideraion 331, 348
Amphiprion polylepis 335
Amphiprion polymnus 332, 342
Amphiprion rosenbergi 348
Amphiprion sebae 332, 344
Amphiprion tricolor 335
Amphiprion trifasciatus 342
Amphiprion tunicatus 346
Amphiprion unimaculatus 342
Amphiprion xanthurus 338
anabatoides, Abudefduf 396, 412
anabatoides, Glyphidodon 412
anabatoides, Glyphisodon 412
anabatoides, Pomacentrus 413, 455
analis, Chromis 414, 450, 454
analis, Dorychromis 454
analis, Heliases 454
analis, Heliastes 454
analis, Pomacentrus 381
Anampses 18, 98
Anampses amboinensis 99, 103
Anampses caeruleopunctatus 99, 105
Anampses diadematus 99, 104
Anampses geographicus 99
Anampses lunatus 103
Anampses melanurus 99, 103
Anampses meleagrides 99, 102
Anampses neoguinaicus 99, 107
Anampses pterophthalmus 99, 101
Anampses taeniatus 104
Anampses twisti 107
Anampses twistii 99, 107
anchorago, Chaerops 32
anchorago, Choerodon 29, 31
anchorago, Choerops 32
anchorago, Choirodon 32
anchorago, Sparus 31
aneitensis, Hemipteronotus 55, 62
aneitensis, Iniistius 62
aneitensis, Novacula 62
angulata, Coris 247
angulatus, Coris 247
angulatus, Glyphisodon 457
annamensis, Amphiprion bifasciatus 342
annularis, Halichoeres 197
annularis, Julis 197
annulata, Coris 253
annulatus, Coris 253
annulatus, Dischistodus 368
annulatus, Halichoeres 218
annulatus, Julis 253
annulatus, Labrus 253
annulatus, Pomacentrus 354, 368
Anthia polymnus 338
Anthias bifasciatus 342
Anthias clarkii 338
Anthias polymnus var. 345
anthioides, Bodianus 42, 46
anthioides, Cossyphus 46
anthioides, Crenilabrus 46
antjerius, Abudefduf 437
antjerius, Glyphidodon 436
antjerius, Glyphidodontops 436
antjerius, Glyphisodon 436
aprinus, Cirrhites 9
aprinus, Cirrhitichthys 9
arago, Labrus 67
Arago, Novacula 67
Arago, Xyrichthys 67
arcatus, Amblycirrhites 7
arcatus, Cirrhites 7
arcatus, Paracirrhites 7
arcuatum, Tetradrachmum 467
arenatus, Cheilinus 76, 93
argus, Halichoeres 182, 230

argus, Julis 230
argus, Labrus 230
aruanum, Tetradrachmum 467
aruanus, Chaetodon 467
aruanus, Dascyllus 463, 467
aruanus, Lutjanus 467
aruanus, Pomacentrus 467
assimilis, Abudefduf 398, 431
assimilis, Chrysiptera 431
assimilis, Glyphidodon 431
ater, Glyphisodon 424
atripes, Chromis 458
auratus, Cheilio 109
auratus, Labrus 109
aureo-maculata, Coris 247
aureo-maculatus, Labrus 247
aureus, Abudefduf 396, 418
aureus, Amblyglyphidodon 418
aureus, Cirrhitichthys 10
aureus, Glyphidodon 418
aureus, Glyphisodon 418
aurigaria, Duymaeria 140
aurigarius, Ctenolabrus 140
auritum, Choerops 258
auritus, Scarichthys 257, 262
auritus, Scarus 257
axillaris, Chromis 451
axillaris, Hinalea 167
axillaris, Julis 167
axillaris, Stethojulis 167
aygula, Coris 242, 247, 253
aygula, Julis 247
azureopunctatus, Abudefduf 445
azureus, Glyphisodon 432
azysron, Abudefduf 397, 425
azysron, Pomacentrus 425
baldwini, Hemipteronotus 60
balinensis, Callyodon 300, 301
balinensis, Glyphisodon 436
balinensis, Pseudoscarus 300
balinensis, Scarus 300
balteata, Hinalea 159
balteatus, Halichoeres 159
balteatus, Julis 159
bandanensis, Halichoeres 167
bandanensis, Julis 167
bandanensis, Glyphisodon 451
bandanensis, Stethojulis 167
bankanensis, Pomacentrus 388
bankanensis, Pseudopomacentrus 390
bankieri, Abudefduf 396, 411
bankieri, Glyphidodon 411
bankieri, Glyphisodon 411
Bankieri, Parapomacentrus 411
bankieri, Pomacentrus 411
bataviensis, Callyodon 272, 323
bataviensis, Pseudoscarus 323
bataviensis, Scarus 323
batjanensis, Abudefduf 399, 444
batjanensis, Glyphidodon 444
batjanensis, Glyphisodon 444
batjanensis, Stegastes 444
batuensis, Coris 249
batuensis, Halichoeres 249
batuensis, Hemicoris 249
batuensis, Julis 249
beauforti, Pomacentrus 369
behni, Abudefduf 397, 422
behni, Glyphidodon 422
Behnii, Glyphisodon 422
Behnii, Paraglyphidodon 422
bengalensis, Abudefduf 395, 403
bengalensis, Chaetodon 403
bengalensis, Glyphidodon 403
bengalensis, Glyphisodon 403
Bennetti, Scarus 300
berendti, Thalassoma 127
biaculeatus, Chaetodon 329
biaculeatus, Holacanthus 329
biaculeatus, Premnas 329
bicantenatus, Julis 129
bicinctus, Amphiprion 332, 338
bicinctus var. of Amphiprion ephippium 339
bicolor, Actinicola 346
bicolor, Amphiprion 346
bicolor, Callyodon 267, 272
bicolor, Cheilio 109
bicolor, Choerojulis 205
bicolor, Glyphidodon 460
bicolor, Halichoeres 179, 205
bicolor, Labrichthys 145
bicolor, Labroides 148, 150

bicolor, Labrus 205
bicolor, Platyglossus 205
bicolor, Pseudoscarus 272
bicolor, Scarus 272
bicolor var.? of Pseudoscarus pulchellus 272
bifasciatus, Amphiprion 341, 342
bifasciatus, Anthias 342
bifasciatus, Dischistodus 367
bifasciatus, Platyglossus 221
bifasciatus, Pomacentrus 354, 367
bifasciatus, Prochilus 342
bifer, Julis 71
bifer, Novaculichthys 67, 71
bifer, Semachlorella 71
bifurcatus, Cheilinus 84
bilineatus, Platyglossus 221
bilineatus, Pomacentrus 389
bilineatus, Pseudopomacentrus 390
bilunulata, Harpe 47
bilunulatus, Bodianus 42, 47
bilunulatus, Cossyphus 47
bilunulatus, Labrus 47
bilunulatus, Lepidaplois 47
bimacula, Cirrhitoidea 14
bimacula, Oxycirrhites 13, 14
bimaculatus, Abudefduf 399, 445
bimaculatus, Cheilinus 75, 84
bimaculatus, Chilinus 85
bimaculatus, Glyphidodon 445
binotopsis, Halichoeres 180, 213
binotopsis, Julis 213
binotopsis, Platyglossus 213
biocellatus, Abudefduf 398, 436
biocellatus, Glyphidodontops 437
biocellatus, Glyphisodon 436
biocellatus, Pomacentrus 388
bivittatus, Iridio 148
bivittatus, Platyglossus 238
bleekeri, Abudefduf 398, 431, 433
bleekeri, Callyodon 271, 293, 318, 320
bleekeri, Cirrhitichthys 10
Bleekeri, Coris 239
bleekeri, Halichoeres 233
bleekeri, Iredaleichthys 433
blochi, Callyodon 270, 309, 319
blochi, Labrus 143
blochii, Callyodon 299, 309
Blochii, Cheilinus 143, 144
Blochii, Scarus 309
Bodianus 17, 41
Bodianus anthioides 42, 46
Bodianus bilunulatus 42, 47
Bodianus bodianus 42
bodianus, Bodianus 42
bodianus, Cossyphus 42
Bodianus diana 42, 44
Bodianus mesothorax 42
Bodianus oxycephalus 42, 48
boholensis, Amphiprion 339
bonang, Abudefduf 397, 420
bonang, Chrysiptera 421
bonang, Glyphidodon 420
bonang, Glyphisodon 420
bonang, Paraglyphidodon 420
Bottae, Scarichthys 259
Bottae, Scarus 259
bowersi, Callyodon 271, 319
brachialis, Pomacentrus 380
Brachypomacentrus albifasciatus 358
brachysoma, Callyodon 262
brachysoma, Leptoscarus 263
Brenchleyi, Choerops 36
breviceps, Amblypomacentrus 369
breviceps, Glyphisodon 368
breviceps, Pomacentrus 354, 364, 368
brevipinnis, Acanthochromis 447
brevipinnis, Heptadecanthus 447
brownriggi, Abudefduf 436
Brownriggii, Abudefduf 437
brownriggii, Chaetodon 436
brownriggii, Chrysiptera 437
brownriggii, Glyphidodon 436
brownriggii, Glyphisodon 437
burroughi, Pomacentrus 365
cacatua, Iniistius 64
caelestinus, Glyphisodon 409
caeruleomaculata, Duymaeria 140
caeruleopunctatus, Anampses 99, 105
caeruleopunctatus, Leptoscarus 257, 259
caeruleopunctatus, Scarichthys 259
caeruleus, Chromis 449, 451
caeruleus, Gomphosus 114
caeruleus, Haplochromis 452

caeruleus, Heliases 451
caeruleus, Pomacentrus 385
calliarus, Cirrhitichthys 10
Calliodon 260
Calliodon caeruleo-punctatus 259
Calliodon vaigiensis 261
Callyodon, 256, 260, 265
Callyodon abacurus 311
Callyodon albipunctatus 313
Callyodon balinensis 300, 301
Callyodon bataviensis 272, 323
Callyodon bicolor 267, 272
Callyodon bleekeri 271, 293, 318, 320
Callyodon blochi 270, 309, 319
Callyodon blochii 299, 309
Callyodon bowersi 271, 319
Callyodon brachysoma 262
?Callyodon capistratoides 325
Callyodon carolinus 262
Callyodon caudofasciatus 302
Callyodon celebicus 311
Callyodon chlorolepis 257
Callyodon chrysopomus 309
Callyodon cyanognathus 286
Callyodon cyanogrammus 311
Callyodon cyanotaenia 271, 316
Callyodon dimidiatus 268, 289
Callyodon dubius 269, 300
Callyodon dussumieri 270, 308
Callyodon erythrodon 271, 316
Callyodon fasciatus 270, 306
?Callyodon formosus 285
Callyodon forsteni 269, 294
Callyodon forsteri 272, 325
Callyodon frenatus 268, 290
Callyodon fumifrons 289
Callyodon genistriatus 262
Callyodon ghobban 269, 270, 304
Callyodon gilberti 324
Callyodon guttatus 280
Callyodon hadji 309
Callyodon harid 267, 276
Callyodon hypselopterus 269, 293
Callyodon hypselosoma 262
Callyodon janthochir 267, 280, 281
Callyodon javanicus 269, 292
Callyodon jenkinsi 324
Callyodon jordani 288, 299
Callyodon lacerta 301
Callyodon latifasciatus 294
Callyodon lazulinus 286
Callyodon macleayi 268, 288
Callyodon macrocheilos 304
Callyodon macrocheilus 270, 303
Callyodon macrorhinus 296
Callyodon maculosus 280
Callyodon margaritus 271, 313
Callyodon microcheilos 275
Callyodon microcheilus 267, 275
Callyodon microrhinos 273
Callyodon microrhinus 267, 273
Callyodon moensi 271, 322
Callyodon moluccensis 262
Callyodon moresbyensis 269, 300
Callyodon muricatus 268, 288, 313
Callyodon mutabilis 271, 319, 321
Callyodon nuchipunctatus 268, 283
Callyodon octodon 314
Callyodon ogos 292
Callyodon oktodon 271, 314
Callyodon ophthalmistius 267, 279
Callyodon oviceps 265, 270, 302
Callyodon papuensis 269, 299
Callyodon pectoralis 268, 286
Callyodon philippinus 309
Callyodon pulchellus 267, 277
Callyodon pyrrhurus 311
Callyodon quoyi 293, 318
Callyodon rhoduropterus 271, 315
Callyodon rostratus 311
Callyodon ruberrimus 296
Callyodon rubroviolaceus 269, 296, 314
Callyodon singaporensis 267, 280
Callyodon snyderi 263
Callyodon sordidus 271, 311, 316, 320
Callyodon spinidens 262
Callyodon strongylocephalus 267, 274
Callyodon tricolor 269, 294, 295
Callyodon ultramarinus 273
Callyodon upolensis 296
Callyodon vermiculatus 268, 282
Callyodon verweyi 269, 298
Callyodon viridibusius 269, 299
Callyodon waigiensis 262

Callyodon xanthopleura 268, 285
Callyodon zonatus 267, 278
Callyodon zonularis 302
?Calostomus 260
Calotomus moluccensis 263
Calotomus snyderi 263
Calotomus vaigiensis 263
calus, Scarus 296
Cantori, Halichoeres 205
Cantori, Julis 205
Cantori, Pseudoscarus 304
capistratoides, Callyodon 325
capistratoides, Pseudoscarus 325
capistratoides, Scarus 325
capistratus, Scarus 275
carolinus, Callyodon 262
carolinus, Leptoscarus 263
castaneus, Chaerojulis 153
casturi, Halichoeres 156
casturi, Julis 156
casturi, Stethojulis 159
caudimacula, Coris 242, 251
caudimacula, Hemicoris 251
caudimacula, Julis
caudimaculatus, Coris 252
caudofasciatus, Callyodon 302
caudofasciatus, Pseudoscarus 302
celebicus, Callyodon 311
celebicus, Cheilinus 76, 93, 94
celebicus, Hemipteronotus 55, 60
celebicus, Julis 133
celebicus, Pseudoscarus 311
celebicus, Scarus 311
centiquadra, Guntheria 190
centiquadra, Hemitautoga 190
centiquadra, Platyglossus 190
centiquadrus, Halichoeres 177, 189
centiquadrus, Labrus 189
centriquadrus, Platyglossus 190
cephalotaenia, Novacula 69
cepidianus, Gomphosus 112
ceramensis, Cheilinus 84
ceramensis, Chilinus 85
Chaerojulis 152
Chaerojulis castaneus 153
Chaerops anchorago 32
Chaetodon aruanus 467
Chaetodon bengalensis 403
Chaetodon biaculeatus 329
Chaetodon brownriggii 436
Chaetodon curacao 414
Chaetodon lividus 356
Chaetodon pavo 385
Chaetodon rotundus 404
Chaetodon sordidus 399
Chaetodon tyrrwhitti 405
Cheilinoides 20
Cheilinoides cyanopleura 23
Cheilinus 18, 74
Cheilinus arenatus 76, 93
Cheilinus bifurcatus 84
Cheilinus bimaculatus 75, 84
Cheilinus Blochii 143, 144
Cheilinus celebicus 76, 93, 94
Cheilinus ceramensis 84
Cheilinus chlorourus 77
Cheilinus chlorurus 75, 76, 81, 143
Cheilinus cingulatus 90
Cheilinus coccineus 86, 88
Cheilinus commersonii 88
Cheilinus decacanthus 76
Cheilinus diagramma 76, 87, 88
Cheilinus diagrammus 88
Cheilinus enneacanthus 81
Cheilinus fasciatus 75, 81
Cheilinus guttatus 76
Cheilinus hexagonatus 90
Cheilinus hexataenia 97
Cheilinus Hoeveni 94
Cheilinus kitlitzi 96
Cheilinus kitlitzii 94
Cheilinus lacrymans 88
Cheilinus melanopleura 84
Cheilinus mentalis 76, 86
Cheilinus notophthalmus 93
Cheilinus orientalis 86
Cheilinus oxycephalus 75, 78
Cheilinus oxyrhynchus 76, 91
Cheilinus punctulatus 76
Cheilinus quinquecinctus 76
Cheilinus radiatus 87, 88
Cheilinus rhodochrous 76, 90
Cheilinus rivulatus 79
Cheilinus rostratus 92, 94

Cheilinus tetrazona 79
Cheilinus trilobatus 75, 79
Cheilinus undulatus 75, 83
Cheilinus unifasciatus 88, 90
Cheilinus zonurus 90
Cheilio 18, 108
Cheilio auratus 109
Cheilio bicolor 109
Cheilio cyano-chloris 109
Cheilio Forskalii 109
Cheilio fuscus 109
Cheilio hemichrysos 109
Cheilio hemychrysos 109
Cheilio inermis 109
Cheilio microstoma 109
Cheilio radiatus 88
Cheilio ramosus 109
Cheilio viridis 109
Cheilolabrus 142
Cheilolabrus magnilabris 146
Cheilolabrus melapterus 146
Cheiloprion 327, 350
Cheiloprion labiatus 351
Chilinus bimaculatus 85
Chilinus ceramensis 85
Chilinus chlorurus 76
Chilinus fasciatus 81
Chilinus godeffroyi 83
Chilinus mentalis 86
Chilinus oxycephalus 78
Chilinus radiatus 88
Chilinus trilobatus 79
Chilinus undulatus 83
Chlorichthys 117
Chlorichthys Hardwickii 122
Chlorichthys steindachneri 137
chlorodon, Scarus 311
chlorolepis, Callyodon 257
chloropterus, Halichoeres 182, 233
chloropterus, Labrus 233
chloropterus, Platyglossus 233
chlorourus, Cheilinus 77
chlorurus, Cheilinus 75, 76, 81, 143
chlorurus, Chilinus 76
chlorurus, Sparus 76, 143
chlorurus, Thalliurus 76
Choerodon 17, 30
Choerodon anchorago 29, 31
Choerodon jordani 38
Choerodon margaritiferus 31, 36
Choerodon melanostigma 31, 38
Choerops meleagris 31
Choerodon oligacanthus 31, 39
Choerodon palawanensis 39
Choerodon schoenleini 31, 34
Choerodon schoenleinii 34, 36
Choerodon vitta 31, 38
Choerodon weberi 32
Choerodon zosterophorus 31, 36
Choerojulis bicolor 205
Choerojulis Dussumieri 207
Choerojulis Hartzfeldi 228
Choerojulis miniata 214
Choerojulis poecila 218
Choerojulis scapularis 186
Choerojulis Schwarzi 209
Choerojulis trimaculata 184
Choerops 30
Choerops anchorago 32
Choerops auritum 258
Choerops Brenchleyi 36
Choerops cyanostolus 34
Choerops graphicus 32
Choerops leucozona 32
Choerops macrodon 32
Choerops maeander 32
Choerops notatus 34
Choerops oligacanthus 39
Choerops ommopterus 34
Choerops Schoenleinii 34
Choerops schönlinii 34
Choerops zosterophorus 36, 38
Choirodon 30
Choirodon anchorago 32
Chromis 327, 448
Chromis amboinensis 458
Chromis analis 414, 450, 454
Chromis atripes 458
Chromis axillaris 451
Chromis caeruleus 449, 451
Chromis cinerascens 450, 457
Chromis desmostigma 449, 453
Chromis dimidiatus 450, 460
Chromis insulindicus 457

Chromis lepidolepis 449, 450
Chromis lepidurus 451
Chromis lepisurus 451
Chromis leucurus 460
Chromis opercularis 456
Chromis philippinus 458
Chromis reticulatus 455
Chromis retrofasciatus 450, 461
Chromis scotochilopterus 455
Chromis ternatensis 450, 458
Chromis weberi 455
Chromis xanthochir 450, 455
Chromis xanthurus 411, 450, 456, 460
chrysargurus, Amphiprion 338
chrysargurus var. of Amphiprion Clarkii 339
chrysargurus, var. of Amphiprion ephippium 339
Chrysiptera 393
Chrysiptera amabilis 434
Chrysiptera assimilis 431
Chrysiptera bonang 421
Chrysiptera brownriggii 437
?Chrysiptera cyanea 432
Chrysiptera glauca 437
Chrysiptera melas 408, 424
Chrysiptera modesta 437
Chrysiptera oxyodon 428
Chrysiptera parasema 430
Chrysiptera xanthonotus 427
Chrysiptera xanthura 422
chrysopoecilus, Dischistodus 375
chrysopoecilus, Pomacentrus 354, 375
chrysopoma, Pseudoscarus 309
chrysopomus, Callyodon 309
chrysopomus, Scarus 309
chrysopterus, Amphiprion 338
chrysopterus var. of Amphiprion ephippium 339
chrysotaenia, Julis 202
chrysotaenia, Platyglossus 202
chrysurus, Pomacentrus 392
cinerascens, Chromis 450, 457
cinerascens, Heliases 457
cinerascens, Heliastes 457
cingulatus, Cheilinus 90
cingulum, Coris 247
cingulum, Glyphidodon 441
cingulum, Hemicoris 247
cingulum, Julis 247
cingulum, Labrus 247
Cirrhilabrus 17, 20
Cirrhilabrus cyanopleura 21, 23
Cirrhilabrus heterodon 23
Cirrhilabrus lyukyuensis 21
Cirrhilabrus solorensis 21
Cirrhilabrus temmincki 21, 22
Cirrhites 2
Cirrhites amblycephalus 7
Cirrhites aprinus 9
Cirrhites arcatus 7
Cirrhites fasciatus 9
Cirrhites forsteri 5
Cirrhites graphidopterus 9
Cirrhites maculatus 2
Cirrhites marmoratus 2
Cirrhites oxycephalus 9
Cirrhites pantherinus 5
Cirrhitichthys 9
Cirrhitichthys aprinus 9
Cirrhitichthys aureus 10
Cirrhitichthys bleekeri 10
Cirrhitichthys calliarus 10
Cirrhitichthys fasciatus 10
Cirrhitichthys graphidopterus 9
Cirrhitichthys maculatus 2
Cirrhitichthys marmoratus 2
Cirrhitichthys oxyrhynchos 10
Cirrhitichthys polyactis 9, 12
Cirrhitoidea 13, 14
Cirrhitoidea bimacula 14
Cirrhitopsis 9
Cirrhitus 1, 2
Cirrhitus maculatus 2
Cirrhitus maculosus 2
Cirrhitus marmoratus 2
Cirrhitus oxycephalus 10
Cirrhitus oxyrhynchos 10
Cirrhitus pinnulatus 2
clarki, Abudefduf 408
clarki, Amphiprion 338
clarckii, Amphiprion 338
clarkii, Anthias 338

clarkii var. of Amphiprion ephippium 339
coccineus, Cheilinus 86, 88
coelestinus, Abudefduf 395, 409
coelestinus, Glyphidodon 405, 410
coelestinus, Glyphisodon 409
coeruleo-punctatus, Calliodon 259
coeruleopunctatus, Scarichthys 259
coeruleo-punctatus, Scarus 259
coeruleovittata, Güntheria 186
coeruleovittatus, Halichoeres 186
coeruleus, Gomphosus 112, 113
commersonii, Cheilinus 88
Coris 20, 241
Coris angulata 247
Coris angulatus 247
Coris annulata 253
Coris annulatus 253
Coris aureo-maculata 247
Coris aygula 242, 247, 253
Coris batuensis 249
Coris Bleekeri 239
Coris caudimacula 242, 251
Coris caudimaculatus 252
Coris cingulum 247
Coris cyanea 247
Coris doliata 243
Coris elongata 253
Coris formosa 242
Coris Gaimard 243
Coris gaimardi 242
Coris greenoughi 246
Coris greenovii 242, 246
Coris heteroptera 239
coris, Julis 247
Coris longipes 253
Coris papuensis 249
Coris pulcherrima 242
Coris taeniatus 253
Coris variegata 242, 247, 249
Coryphaena pentadactyla 57
Cossyphodes 30
Cossyphodes macrodon 31
Cossyphus 41
Cossyphus albolineatus 48
Cossyphus anthioides 46
Cossyphus bilunulatus 47
Cossyphus bodianus 42
Cossyphus cyanostolus 34
Cossyphus diana 44
Cossyphus dimidiatus 148
Cossyphus echis 97
Cossyphus filamentosus 140
Cossyphus macrodon 31
Cossyphus mesothorax 42
Cossyphus ommopterus 34
Cossyphus oxycephalus 48
Cossyphus Schoenleinii 34
Cossyphus unimaculatus 48
Cossyphus zosterophorus 46
cyaanostolus, Choerops 34
Crenilabrus anthioides 46
Crenilabrus enneacanthus 140
Crenilabrus leucozona 31
Crenilabrus nematopterus 140
Crenilabrus oligacanthus 39
Crenilabrus spilogaster 140
Cryptotomus 256, 257, 260
Cryptotomus spinidens 261, 262
Ctenolabrus aurigarius 140
Ctenolabrus flagellifer 140
Ctenolabrus rubellio 140
cupido, Julis 132
cupido, Thalassoma 119, 132
curacao, Abudefduf 396, 414, 418
curacao, Amblyglyphidodon 415
curacao, Chaetodon 414
curacau, Abudefduf 415
curassao, Glyphisodon 414
Cuvieri, Halichoeres 233
Cuvieri, Julis 233
cyanea, Coris 247
cyanea, Chrysiptera 432
cyaneus, Abudefduf 398, 432, 434
cyaneus, Glyphidodon 430
cyaneus, Glyphidodontops 430
cyaneus, Glyphisodon 432
cyano-chloris, Cheilio 109
cyanogaster, Julis 127
cyanognathos, Pseudoscarus 286
cyanognathos, Scarus 286
cyanognathus, Callyodon 286
cyanogrammus, Callyodon 311
cyanomos, Pomacentrus 353, 360, 362

cyanopleura, Cheilinoides 23
cyanopleura, Cirrhilabrus 21, 23
cyanopleura, Halichoeres 176, 183
cyanopleura, Julis 183
cyanopleura, Leptojulis 183
cyanospilus, Pomacentrus 358
cyanostolus, Cossyphus 34
cyanotaenia, Callyodon 271, 316
cyanotaenia, Labrichthys 153
cyanotaenia, Pseudoscarus 316
cyanotaenia, Scarus 316
cyanotaenia, Thysanocheilus 153
cymatogrammus, Halichoeres 186
Cymolutes 17, 51
Cymolutes lecluse 52
Cymolutes leclusii 52
Cymolutes praetextatus 52
Dascyllus 327, 461
Dascyllus aruanus 463, 467
Dascyllus aruanus var. 469
Dascyllus aruanus var. a 469
Dascyllus marginatus 445, 463, 465
Dascyllus melanurus 463, 469
Dascyllus niger 463
Dascyllus polyacanthus 447
Dascyllus reticulatus 465
Dascyllus trimaculatus 462, 463
Dascyllus xanthosoma 465
Dascyllus xanthurus 362
Daya 348
Daya jerdoni 349
Daya jerdoni var. fusca 349
dayi, Halichoeres 181, 228
Dayi, Platyglossus 228
decacanthus, Cheilinus 76
decussatus, Sparus 189
delurus, Pomacentrus 389
desmostigma, Chromis 449, 453
diadematus, Anampses 99, 104
diagramma, Cheilinus 76, 87, 88
diagrammus, Cheilinus 88
diana, Bodianus 42, 44
diana, Cossyphus 44
diana, Labrus 44
diana, Lepidaplois 44
dicki, Abudefduf 442
dickii, Abudefduf 399, 442
Dickii, Glyphidodon 442
dickii, Glyphisodon 442
dickii, Negostegastes 442
Dickii, Stegastes 442
dieschismenacanthoides, Halichoeres 209
dieschismenacanthoides, Julis 209
dieschismenacanthus, Halichoeres 209
dieschismenacanthus, Julis 209
digramma, Labrus 88
dimidiatus, Callyodon 268, 289
dimidiatus, Chromis 450, 460
dimidiatus, Cossyphus 148
dimidiatus, Heliastes 460
dimidiatus, Labroides 148
dimidiatus, Pomacentrus 389
dimidiatus, Pseudopomacentrus 389
dimidiatus, Pseudoscarus 289
dimidiatus, Scarus 289
dimidiatus, Tautoga 145
Diproctacanthus 19, 151
Diproctacanthus xanthurus 151
Diproktacanthus xanthurus 151
Dischistodus 352
Dischistodus annulatus 368
Dischistodus bifasciatus 367
Dischistodus chrysopoecilus 375
Dischistodus fasciatus 374
Dischistodus notophthalmus 377
Dischistodus prosopotaenia 372
Dischistodus trimaculatus 371
Discosoma 344
Doleschalli, Halichoeres 209
Doleschalli, Platyglossus 209
doliata, Coris 253
doliata, Hologymnosus 253
doliatus, Julis 253
doliatus, Labrus 253
dorsale, Thalassoma 122
dorsalis, Julis 122
dorsalis, Pomacentrus 388
Dorychromis analis 454
dubius, Callyodon 269, 300
dubius, Pseudoscarus 301
dubius, Scarus 300
duperreyi, Thalassoma 139
dussumieri, Callyodon 270, 308

Dussumieri, Choerojulis 207
Dussumieri, Julis 207
dussumieri, Platyglossus 207
Dussumieri, Pseudoscarus 308
Dussumieri, Scarus 308
Duymaeria 18, 139
Duymaeria amboinensis 140
Duymaeria aurigaria 140
Duymaeria caeruleomaculata 140
Duymaeria enneacanthus 140
Duymaeria filamentosa 140
Duymaeria flagellifer 140
Duymaeria flagellifera 140
Duymaeria guttata 141
Duymaeria japonica 140
Duymaeria nematoptera 140
Duymaeria nematopterus 140
Duymaeria rubellio 140
Duymaeria spilogaster 140
echis, Cossyphus 97
elegans, Halichoeres 186
elegans, Julis 186
elongata, Coris 253
emarginatus, Pomacentrus 388
enneacanthus, Cheilinus 81
enneacanthus, Crenilabrus 140
enneacanthus, Duymaeria 140
enneacanthus, Labrus 81
ensifer, Sargus 329
ephippium, Amphiprion 332, 334, 337
ephippium, Lutjanus 334
ephippium, Prochilus 335
ephippium var. of Amphiprion ephippium 335
Epibulus 18, 72
Epibulus insidiator 73
epigrammata, Premnas 329
eretensis, Scarus 273
erythrodon, Callyodon 271, 316
erythrodon, Pseudoscarus 317
erythrodon, Scarus 316
Euhypsocara 41, 42
Eupomacentrus 352
Eupomacentrus albifasciatus 358
Eupomacentrus lividus 356, 358
Eupomacentrus nigricans 358
Eupomacentrus nigricans var. subniger 358
Eupomacentrus rectifrenum 393
Euschistodus 393
eximius, Halichoeres 189
exornatus, Julis 207
fasciata, Tautoga 144
fasciatus, Callyodon 270, 306
fasciatus, Cheilinus 75, 81
fasciatus, Chilinus 81
fasciatus, Cirrhites 9
fasciatus, Cirrhitichthys 10
fasciatus, Dischistodus 374
fasciatus, Hemigymnus 143
fasciatus, Hologymnosus 253
fasciatus, Labrus 143
fasciatus, Pomacentrus 354, 373, 377
fasciatus, Scarus 306
fasciatus, Sparus 81
fasciatus, Thalliurus 144
fijiensis, Halichoeres 230
filamentosa, Duymaeria 140
filamentosus, Abudefduf 413
filamentosus, Cossyphus 140
filamentosus, Glyphidodon 413
filamentosus, Pteragogus 140
filifer, Abudefduf 396, 419
Fissilabrus 147
flagellifer, Ctenolabrus 140
flagellifer, Duymaeria 140
flagellifera, Duymaeria 140
flavoguttata var. of Pseudoscarus Troschelii 311
flavomarginatus, Pseudoscarus 284
flos-corallis, Platyglossus 193
formosa, Coris 242
formosanus, Pomacentrus 349
formosus, Callyodon 285
formosus, Halichoeres 242
formosus, Julis 129, 242
formosus, Labrus 242
formosus, Scarus 286
Forskalii, Cheilio 109
forsteni, Callyodon 269, 294
Forsteni, Pseudoscarus 294
forsteri, Callyodon 272, 325
Forsteri, Cirrhites 5

Forsteri, Grammistes 5
forsteri, Paracirrhites 5
forsteri, Pseudoscarus 325
forsteri, Scarus 325
fraenatus, Pseudoscarus 291
frenatus, Amphiprion 334
frenatus, Callyodon 268, 290
frenatus, Heliases 451
frenatus, Heliastes 451
frenatus, Pseudoscarus 290
frenatus, Scarus 290
frontalis, Pseudoscarus 288
fuliginosus, Hemigymnus 144
fuliginosus, Labrus 143
fumifrons, Callyodon 289
fusca, Julis 129
fusca var. of Daya jerdoni 349
fuscum, Thalassoma 118, 126, 129
fuscus, Cheilio 109
fuscus, Gomphosus 115
fuscus, Labrus 109, 129
fuscus, Pristotis 388
fusiformis, Labrus 109
Gaimard, Coris 243
Gaimard, Julis 242
gaimardi, Coris 242
Gaimardi, Julis 242
gallus, Scarus 133
genistriatus, Callyodon 262
genivittatus, Thalassoma 138
Geoffroyi, Halichoeres 172
Geoffroyi, Julis 172
Geoffroyi, Macropharyngodon 172
geographicus, Anampses 99
Gerranus tankervillae 5
ghobbam, Pseudoscarus 304
ghobban, Callyodon 269, 270, 304
ghobban, Pseudoscarus 304
ghobban, Scarus 304
gibbifrons, Julis 247
gilberti, Callyodon 324
gilberti, Scarus 323
Girardi, Julis 174
girardi, Pseudojulis 174
glauca, Chrysiptera 437
glaucus, Abudefduf 437
glaucus, Glyphisodon 436
glaucus, Iredaleichthys 437
Glyphidodon affinis 403
Glyphidodon amabilis 434
Glyphidodon amboinensis 361
Glyphidodon anabatoides 412
Glyphidodon antjerius 436
Glyphidodon assimilis 431
Glyphidodon aureus 418
Glyphidodon bankieri 411
Glyphidodon batjanensis 444
Glyphidodon behni 422
Glyphidodon bengalensis 403
Glyphidodon bicolor 460
Glyphidodon bimaculatus 445
Glyphidodon bonang 420
Glyphidodon brownriggii 436
Glyphidodon cingulum 441
Glyphidodon coelestinus 405, 410
Glyphidodon cyaneus 430
Glyphidodon Dickii 442
? Glyphidodon filamentosus 413
Glyphidodon lacrymatus 439
Glyphidodon leucogaster 416
Glyphidodon leucozona 440
Glyphidodon melas 424
Glyphidodon melanopus 422
Glyphidodon modestus 436
Glyphidodon nigrifrons 414
Glyphidodon notatus 408
Glyphidodon oxyodon 428
Glyphidodon pallidus 446
Glyphidodon plagiometopon 428
Glyphidodon saxatilis 405, 410
Glyphidodon schlegelii 414
Glyphidodon septemfasciatus 401
Glyphidodon sordidus 399
Glyphidodon trifasciatus 414
Glyphidodon unifasciatus 442
Glyphidodon unimaculatus 436
? Glyphidodon waigiensis 405
Glyphidodon Westermani 368
Glyphidodon xanthozona 434
Glyphidodon xanthurus 422
Glyphidodontops 393
Glyphidodontops albofasciatus 434
Glyphidodontops amabilis 435
Glyphidodontops antjerius 436

Glyphidodontops biocellatus 437
Glyphidodontops cyaneus 430
Glyphidodontops modestus 436
Glyphidodontops thoracotaeniatus 420
Glyphidodontops unimaculatus 436
Glyphidodontops uniocellatus 431
Glyphidodontops zonatus 436
Glyphisodon 393
Glyphisodon albofasciatus 443
Glyphisodon anabatoides 412
Glyphisodon angulatus 457
Glyphisodon antjerius 436
Glyphisodon ater 424
Glyphisodon aureus 418
Glyphisodon azureus 432
Glyphisodon balinensis 436
Glyphisodon bandanensis 451
Glyphisodon bankieri 411
Glyphisodon batjanensis 444
Glyphisodon Behnii 422
Glyphisodon bengalensis 403
Glyphisodon biocellatus 436
Glyphisodon bonang 420
Glyphisodon breviceps 368
Glyphisodon brownriggii 437
Glyphisodon caelestinus 409
Glyphisodon coelestinus 409
Glyphisodon curassao 414
Glyphisodon cyaneus 432
Glyphisodon dickii 442
Glyphisodon glaucus 436
Glyphisodon hedleyi 432
Glyphisodon lacrymatus 439, 446
Glyphisodon leucogaster 414, 416
Glyphisodon leucozona 440
Glyphisodon melanopus 422
Glyphisodon melas 424
Glyphisodon modestus 436
Glyphisodon nemurus 411
Glyphisodon nigrifrons 414
Glyphisodon oxyodon 428
Glyphisodon plagiometopon 428
Glyphisodon quadrifasciatus 405
Glyphisodon rahti 405
Glyphisodon rathi 410
Glyphisodon Rossi 436
Glyphisodon saxatilis 405, 410
Glyphisodon schlegelii 414
Glyphisodon septemfasciatus 401
Glyphisodon sordidus 399
Glyphisodon ternatensis 414
Glyphisodon trifasciatus 414
Glyphisodon unimaculatus 436
?Glyphisodon uniocellatus 431
Glyphisodon vaigiensis 404
Glyphisodon waigiensis 405
Glyphisodon xanthonotus 426
Glyphisodon xanthozona 434
Glyphisodon xanthurus 422
Glyphisodon zonatus 436
godeffroyi, Pseudoscarus 282
godeffroyi, Chilinus 83
Goldiei, Pseudoscarus 317
Gomphosus 18, 111
Gomphosus caeruleus 114
Gomphosus cepidianus 112
Gomphosus coeruleus 112, 113
Gomphosus fuscus 115
Gomphosus melanotus 115
Gomphosus notostigma 115
Gomphosus ornatus 113
Gomphosus pectoralis 114
Gomphosus tricolor 112
Gomphosus undulatus 115
Gomphosus varius 112, 114
Gomphosus viridis 113
gracilis, Julis 133, 135
Grammistes Forsteri 5
grammorhynchus, Pomacentrus 389
graphicus, Choerops 32
graphidopterus, Cirrhites 9
graphidopterus, Cirrhitichthys 9
greenovii, Coris 242, 246
greenovii, Julis 246
greenoughi, Coris 246
guntheri, Thalassoma 130
Güntheri, Julis 130
güntheri, Thalassoma 119, 126, 130, 133
Guntheria centiquadra 190
Güntheria 175, 177
Güntheria coeruleovittata 186
Güntheria scapularis 186
Güntheria trimaculata 184
guttata, Duymaeria 141

guttatus, Callyodon 280
guttatus, Cheilinus 76
guttatus, Halichoeres 230
guttatus, Labrus 230
guttatus, Platyglossus 230
guttulatus, Platyglossus 235
gymnocephalus, Halichoeres 182, 234
gymnocephalus, Labrus 234
gymnocephalus, Platyglossus 234
gymnognathus, Pseudoscarus 316
gymnognathus, Scarus 316
Gymnopropoma 41, 42
hadji, Callyodon 309
Halichoeres 20, 175
Halichoeres amboinensis 181, 223
Halichoeres annularis 197
Halichoeres annulatus 218
Halichoeres argus 182, 230
Halichoeres bandanensis 167
Halichoeres balteatus 159
Halichoeres batuensis 249
Halichoeres bicolor 179, 205
Halichoeres binotopsis 180, 213
Halichoeres bleekeri 233
Halichoeres Cantori 205
Halichoeres casturi 156
Halichoeres centiquadrus 177, 189
Halichoeres centriquadrus 190
Halichoeres chloropterus 182, 233
Halichoeres coeruleovittatus 186
Halichoeres Cuvieri 233
Halichoeres cyanopleura 176, 183
Halichoeres cymatogrammus 186
Halichoeres dayi 181, 228
Halichoeres dieschismenacanthoides 209
Halichoeres dieschismenacanthus 209
Halichoeres Doleschalli 209
Halichoeres elegans 186
Halichoeres eximius 189
Halichoeres fijiensis 230
Halichoeres formosus 242
Halichoeres Geoffroyi 172
Halichoeres guttatus 230
Halichoeres gymnocephalus 182, 234
Halichoeres harloffii 218
Halichoeres hartzfeldi 182, 228
Halichoeres hartzfeldii 228
Halichoeres hoeveni 178, 202
Halichoeres hortulanus 190
Halichoeres hyrtli 180, 220
Halichoers Hyrtlii 220
Halichoeres interruptus 161
Halichoeres javanensis 236
Halichoeres javanicus 183, 228, 235, 236
Halichoeres kallochroma 177, 193
Halichoeres kallopisos 192
Halichoeres kalosoma 165
Halichoeres kawarin 181, 227
Halichoeres kneri 181, 224
Halichoeres leparensis 180, 211, 232
Halichoeres leucurus 177, 192, 194
Halichoeres macleayi 170
Halichoeres margaritaceus 180, 216
Halichoeres margaritophorus 205
Halichoeres marginatus 178, 197, 200
Halichoeres melanurus 178, 195
Halichoeres meleagris 172
Halichoeres miniatus 180, 214
Halichoeres modestus 234
Halichoeres mola 207
Halichoeres nebulosus 180, 218
Halichoeres nigrescens 179, 207
Halichoeres notophthalmus 177, 188, 207
Halichoeres notopsis 178, 199
Halichoeres opercularis 216
Halichoeres papilionaceus 179, 209
Halichoeres pardaleocephalus 181, 223
Halichoeres phaiopus 199
Halichoeres phaiotaenia 186
Halichoeres phekadopleura 164
Halichoeres podostigma 183, 237
Halichoeres poecila 218
Halichoeres poecilus 218
Halichoeres polyophthalmus 230
Halichoeres prosopeion 180, 222
Halichoeres pseudominiatus 216
Halichoeres purpurascens 192
Halichoeres pyrrhogrammatoides 183
Halichoeres reichei 218
Halichoeres Renardi 158
Halichoeres richmondi 177, 195

Halichoeres scapularis 177, 186
Halichoeres Schröderii 249
Halichoeres Schwarzi 209
Halichoeres Schwarzii 209
Halichoeres Sebae 156
Halichoeres sexfasciatus 144
Halichoeres solorensis 178, 204
Halichoeres spilurus 184
Halichoeres strigiventer 163
Halichoeres Temmincki 192
Halichoeres timorensis 181, 225
Halichoeres trimaculatus 177, 184
Halichoeres variegatus 249
Halichoeres vroliki 178, 201
Halichoeres xanti 179, 210
Haplochromis caeruleus 452
hardwicke, Thalassoma 123
hardwicki, Thalassoma 118, 122
Hardwickii, Chlorichthys 122
hardwickii, Sparus 122
harid, Callyodon 267, 276
harid, Pseudoscarus 276
harid, Scarus 276, 304
harid, var. mastax, Pseudoscarus 276
haridoïdes, Scarus 304
harloffii, Halichoeres 218
harloffii, Julis 218
Harpe 41
Harpe bilunulata 47
Harpe oxycephalus 49
Hartzfeldi, Choerojulis 228
hartzfeldi, Halichoeres 182, 228
hartzfeldii, Halichoeres 228
Hartzfeldii, Julis 228
hassek, Labrus 109
hebardi, Pomacentrus 383
hedleyi, Abudefduf 433
hedleyi, Glyphisodon 432
hedleyi, Iredaleichthys 433
Heliases 448
Heliases amboinensis 458
Heliases analis 454
Heliases caeruleus 451
Heliases cinerascens 457
Heliases frenatus 451
Heliases lepisurus 451
Heliases macrochir 454
Heliases reticulatus 465
Heliases ternatensis 458
Heliases xanthochir 455
Heliases xanthurus 456
Heliastes analis 454
Heliastes cinerascens 457
Heliastes dimidiatus 460
Heliastes frenatus 451
Heliastes lepidurus 451
Heliastes roseus 472
Heliastes ternatensis 458
Heliastes xanthochir 455
hemichrysos, Cheilio 109
hemychrysos, Cheilio 109
Hemicoris batuensis 249
Hemicoris caudimacula 251
Hemicoris cingulum 247
Hemicoris variegatus 249
hemicyaneus, Abudefduf 398, 430, 434
Hemiglyphidodon 393
Hemiglyphidodon plagiometopon 429
Hemigymnus 19, 142
Hemigymnus fasciatus 143
Hemigymnus fuliginosus 144
Hemigymnus leucomus 144
Hemigymnus melanopterus 145
Hemigymnus melapterus 143, 145
Hemigymnus sexfasciatus 144
Hemipteronotus 18, 53
Hemipteronotus aneitensis 55, 62
Hemipteronotus baldwini 60
Hemipteronotus celebicus 55, 60
Hemipteronotus liogenys 62
Hemipteronotus macrolepidotum 67
Hemipteronotus melanopus 55, 58
Hemipteronotus nigromaculatus 56
Hemipteronotus pentadactylum 57
Hemipteronotus pentadactylus 54, 57
Hemipteronotus quinque-maculatus 57
Hemipteronotus spilonotus 58
Hemipteronotus stockumi 54, 56
Hemipteronotus twisti 54, 55
Hemipteronotus Twistii 55
hemisphaerium, Labrus 69
hemisphaerium, Novaculichthys 69
Hemitautoga 175
Hemitautoga centiquadra 190

Hemitautoga notophthalmus 188
Heptadecanthus 446
Heptadecanthus brevipinnis 447
Heptadecanthus longicaudis 447
Heptadecanthus maculosus 447
heterodon, Cirrhilabrus 23
heteroptera, Coris 239
heteropterus, Julis 239
heteropterus, Pseudocoris 239
hexagonatus, Cheilinus 90
hexataenia, Cheilinus 97
hexataenia, Pseudocheilinus 97
hexataenia, Pseudochilinus 97
Hinalea axillaris 167
Hinalea balteata 159
Hoedti, Novacula 71
hoedtii, Novacula 71
Hoeveni, Cheilinus 94
hoeveni, Halichoeres 178, 202
Hoeveni, Julis 202
Hoevenii, Platyglossus 202
Holacanthus biaculeatus 329
Holocentrus nigricans 357
Holocentrus sonnerat 329
Hologymnosus 20, 252
Hologymnosus doliata 253
Hologymnosus fasciatus 253
Hologymnosus semidiscus 241, 253
Hologymnosus taeniatus 253
Hoplochromis 448
hortulanus, Halichoeres 190
hortulanus, Julis 189
hortulanus, Labrus 189
hortulanus, Platyglossus 190
hypselopterus, Callyodon 269, 293
hypselopterus, Pseudoscarus 293
hypselopterus, Scarus 293
hypselosoma, Callyodon 262
Hypsigenys 30
Hypsigenys macrodon 31
Hypsigenys oligacanthus 39
Hypsigenys ommopterus 34
hyrtli, Halichoeres 180, 220
Hyrtlii, Halichoeres 220
Hyrtlii, Julis 220
hyrtlii, Platyglossus 221
immanis, Thalassoma 127
indicus, Amblycirrhitus 10
inermis, Cheilio 109
inermis, Labrus 109
Iniistius 18, 54, 62
Iniistius aneitensis 62
Iniistius cacatua 64
Iniistius leucozonus 64
Iniistius mundicorpus 63
Iniistius pavo 63
Iniistius pavoninus 64
Iniistius tetrazona 64
insidiator, Epibulus 73
insidiator, Sparus 73
insulindicus, Chromis 457
intermedius, Amphiprion 342
interorbitalis, Pomacentrus 372
interrupta, Stethojulis 161
interruptus, Halichoeres 161
interruptus, Julis 161
Iredaleichthys bleekeri 433
Iredaleichthys glaucus 437
Iredaleichthys hedleyi 433
Iredaleichthys modestus 437
Iredaleichthys pallidus 446
Iredaleichthys sapphirus 433
Iridio 175
Iridio bivittatus 148
Janseni, Julis 119
janseni, Thalassoma 118, 119
Janseni var. b, Julis 119
Jansenii, Julis 119
jansenii, Thalassoma 119
janthochir, Callyodon 267, 280, 281
janthochir, Pseudoscarus 281
janthochir, Scarus 281
japonica, Duymaeria 140
japonicus, Amphiprion 338
Japonicus var. of Amphiprion Clarkii 339
javanensis, Halichoeres 236
javanensis, Julis 236
javanica, Novacula 65
javanicus, Callyodon 269, 292
javanicus, Halichoeres 183, 228, 235, 236
javanicus, Julis 236
javanicus, Platyglossus 236

javanicus, Pseudoscarus 292
javanicus, Scarus 292
Javanicus, Xyrichthys 65
jenkinsi, Callyodon 324
jenkinsi, Scarus 323
jerdoni, Daya 349
jerdoni, Pomacentrus 349
jordani, Abudefduf 447
jordani, Callyodon 288, 299
jordani, Choerodon 38
jourdin, Lutjanus 342
julioides, Novacula 67
Julis 117, 241
Julis amblycephalus 136
Julis amboinensis 223
Julis annularis 197
Julis annulatus 253
Julis argus 230
Julis axillaris 167
Julis aygula 247
Julis balteatus 159
Julis bandanensis 167
Julis batuensis 249
Julis bicantenatus 129
Julis bifer 71
Julis binotopsis 213
Julis Cantori 205
Julis casturi 156
Julis caudimacula 251
Julis celebicus 133
Julis chrysotaenia 202
Julis cingulum 247
Julis coris 247
Julis cupido 132
Julis Cuvieri 233
Julis cyanogaster 127
Julis cyanopleura 183
Julis dieschismenacanthoides 209
Julis dieschismenacanthus 209
Julis doliatus 253
Julis dorsalis 122
Julis Dussumieri 207
Julis elegans 186
Julis exornatus 207
Julis formosus 129, 242
Julis fusca 129
Julis Gaimard 242
Julis Gaimardi 242
Julis Geoffroyi 172
Julis gibbifrons 247
Julis Girardi 174
Julis gracilis 133
Julis greenovii 246
Julis Güntheri 130
Julis harloffii 218
Julis Hartzfeldii 228
Julis heteropterus 239
Julis Hoeveni 202
Julis hortulanus 189
Julis Hyrtlii 220
Julis interruptus 161
Julis Janseni 119
Julis Janseni var. b. 119
Julis Jansenii 119
Julis javanensis 236
Julis javanicus 236
Julis kallochroma 193
Julis kallopisos 192
Julis kalosoma 165
Julis kawarin 227
Julis leparensis 211
Julis leucorhynchos 246
Julis lunaris 133
Julis margaritaceus 216
Julis margaritophorus 205
Julis marginatus 197
Julis melanochir 137
Julis melanurus 195
Julis meleagris 172
Julis meniscus 133
Julis miniatus 214
Julis modestus 234
Julis mola 205, 207, 220
Julis nebulosus 218
Julis notophthalmus 207
Julis notopsis 199
Julis oxyrhynchos 253
Julis papilionaceus 209
Julis pardaleocephalus 223
Julis phaiopus 199
Julis phaiotaenia 186
Julis phekadopleura 164
Julis podostigma 237
Julis poecila 218

Julis polyophthalmus 230
Julis porphyrocephalus 133
Julis praetextata 52
Julis prosopeion 222
Julis pseudominiatus 216
Julis pulcherrima 243
Julis purpurea 125, 127, 129
Julis purpureus 127
Julis pyrrhogrammatoides 183
Julis quadricolor 127, 129, 130
Julis Reichei 218
Julis Renardi 158
Julis rosea 253
Julis ruppelii 247
Julis Ruppellii 130
Julis scapularis 186
Julis Schröderii 249
Julis Schwanefeldii 121
Julis Schwarzii 209
Julis Sebanus 156
Julis semicoeruleus 127
Julis semidecorata 233
Julis semifasciatus 122
Julis semipunctatus 247
Julis solorensis 204
Julis Souleyetii 125
Julis spilurus 184
Julis strigiventer 163
Julis Temmincki 192
Julis timorensis 225
Julis trilobata 127, 129
Julis trilobata var α 129
Julis trilobata var. β 127
Julis trilobatus 129
Julis trimaculata 184
Julis trimaculatus 67
Julis umbrostigma 125
Julis umbrostygma 125
Julis urostigma 122
Julis vanikorensis 69
Julis variegatus 249
Julis Vroliki 201
kallochroma, Halichoeres 177, 193
kallochroma, Julis 193
kallochroma, Platyglossus 193
kallopisos, Halichoeres 192
kallopisos, Julis 192
kallosoma, Novacula 71
kallosoma, Novaculichthys 71
kallosoma, Stethojulis 165
kalosoma, Halichoeres 165
kalosoma, Julis 165
kalosoma, Stethojulis 156, 165
kalunko, Pomacentrus 388
kawarin, Halichoeres 181, 227
kawarin, Julis 227
kawarin, Platyglossus 227
kitlitzi, Cheilinus 96
kitlitzii, Cheilinus 94
kneri, Halichoeres 181, 224
kneri, Platyglossus 224
knerii, Pseudoscarus 302
labiatus, Cheiloprion 351
labiatus, Pomacentrus 351
labiosus, Pseudoscarus 300, 325
Labrastrum 139
Labrichthys 19, 152
Labrichthys bicolor 145
Labrichthys cyanotaenia 153
Labroides 19, 147
Labroides bicolor 148, 150
Labroides dimidiatus 148
Labroides latovittatus 148
Labroides paradiseus 148
Labroides xanthurus 151
Labrus albovittatus 159
Labrus annulatus 253
Labrus arago 67
Labrus argus 230
Labrus auratus 109
Labrus aureo-maculatus 247
Labrus bicolor 205
Labrus bilunulatus 47
Labrus blochi 143
Labrus centiquadrus 189
Labrus chloropterus 233
Labrus cingulum 247
Labrus diana 44
Labrus diagramma 88
Labrus doliatus 253
Labrus enneacanthus 81
Labrus fasciatus 143
Labrus formosus 242
Labrus fuliginosus 143

Labrus fuscus 109, 129
Labrus fusiformis 109
Labrus guttatus 230
Labrus gymnocephalus 234
Labrus hassek 109
Labrus hemisphaerium 69
Labrus hortulanus 189
Labrus inermis 109
Labrus latovittatus 148
Labrus leucurus 192
Labrus lunaris 133
Labrus macrodontus 31
Labrus macrolepidotus 67
Labrus marmoratus 2
Labrus melapteronotus 144
Labrus melapterus 145
Labrus mesothorax 42
Labrus nigrescens 207
Labrus pinnulatus 2
Labrus purpurescens 192
Labrus rufus 42
Labrus semidiscus 253
Labrus sexfasciatus 404, 409
Labrus taenionotus 67
Labrus taeniourus 69
Labrus trilineatus 156, 226
Labrus trilobatus 129
lacerta, Callyodon 301
lacrymans, Cheilinus 88
lacrymatus, Abudefduf 399, 439
lacrymatus, Glyphidodon 439
lacrymatus, Glyphisodon 439, 446
lacrymatus, Negostegastes, 440
lacrymatus, Stegastes 439
laticlavius, Amphiprion 342
latifasciatus, Callyodon 294
latovittatus, Labroides 148
latovittatus, Labrus 148
latus, Scarus 276
lazulinus, Callyodon 286
lecluse, Cymolutes 52
lecluse, Xyrichthys 52
leclusii, Cymolutes 52
leparensis, Halichoeres 180, 211, 232
leparensis, Julis 211
leparensis, Platyglossus 211
Lepidaplois 41, 42
Lepidaplois bilunulatus 47
Lepidaplois diana 44
Lepidaplois mesothorax 42
Lepidaplois oxycephalus 49
Lepidochromis lepidolepis 450
lepidolepis, Chromis 449, 450
lepidolepis, Lepidochromis 450
Lepidozygus 327, 470
Lepidozygus tapeinosoma 471
lepidurus, Chromis 451
lepidurus, Heliastes 451
lepisurus, Chromis 451
lepisurus, Heliases 451
Leptojulis 175, 176
Leptojulis cyanopleura 183
Leptojulis pardalis 172
Leptojulis pyrrhogrammatoides 183
Leptoscarus 256, 260
Leptoscarus brachysoma 263
Leptoscarus caeruleopunctatus 257, 259
Leptoscarus carolinus 263
Leptoscarus moluccensis 263
Leptoscarus vaigiensis 257, 260, 263
Leptoscarus viridescens 263
leucogaster, Abudefduf 396, 416
leucogaster, Amblyglyphidodon 416
leucogaster, Glyphidodon 416
leucogaster, Glyphisodon 414, 416
leucomus, Hemigymnus 144
leucomus, Tautoga 144
leucopleura, Pomacentrus 358
leucorhynchos, Julis 246
leucosphyrus, Pomacentrus 361
leucozona, Abudefduf 399, 440
leucozona, Choerops 32
leucozona, Crenilabrus 31
leucozona, Glyphidodon 440
leucozona, Glyphisodon 440
leucozona, Negostegastes 441
leucozona, Stegastes 441
leucozonus, Abudefduf 441
leucozonus, Iniistius 64
leucurus, Chromis 460
leucurus, Halichoeres 177, 192, 194
leucurus, Labrus 192
leudodesmus, Premnas 329
limbatus, Pseudoscarus 284

limbatus, Scarus 283
liogenys, Hemipteronotus 62
littoralis, Pomacentrus 354, 364, 384, 389
littoralis, Pseudopomacentrus 364
lividus, Chaetodon 356
lividus, Eupomacentrus 356, 358
lividus, Pomacentrus 353, 356, 358, 393
longicaudis, Acanthochromis 447
longicaudis, Heptadecanthus 447
longiceps Pseudoscarus 276
longiceps, Scarus 276
longipes, Coris 253
longirostris, Acarauna 113
lunare, Thalassoma 119, 133
lunaris, Julis 133
lunaris, Labrus 133
lunaris, Thalassoma 133
lunatus, Anampses 103
lutescens, Thalassoma 138, 252
Lutjanos trifasciatus 329
Lutjanus aruanus 467
Lutjanus ephippium 334
Lutjanus jourdin 342
Lutjanus percula 345
lyukyuensis, Cirrhilabrus 21
macleayi, Callyodon 268, 288
macleayi, Halichoeres 170
macleayi, Pomacentrus 390
macleayi, Pseudopomacentrus 390
macrocheilos, Callyodon 304
macrocheilos, Pseudoscarus 303
macrocheilos, Scarus 303
macrocheilus, Callyodon 270, 303
macrochilus, Pseudoscarus 304
macrochir, Heliases 454
Macrochoerodon oligacanthus 39
macrodon, Choerops 32
macrodon, Cossyphodes 31
macrodon, Cossyphus 31
macrodon, Hypsigenys 31
macrodontus, Labrus 31
macrolepidota, Novacula 67
macrolepidotum, Hemipteronotus 67
macrolepidotus, Labrus 67
macrolepidotus, Novaculichthys 67
macrolepidotus, Xyrichthys 67
Macropharyngodon 19, 171
Macropharyngodon Geoffroyi 172
Macropharyngodon meleagris 172
macrorhinus, Callyodon 296
macrostoma, Amphiprion 335
macrostoma, Prochilus 337
maculatus, Cirrhites 2
maculatus, Cirrhitichthys 2
maculatus, Cirrhitus 2
maculosus, Acanthochromis 447
maculosus, Callyodon 280
maculosus, Cirrhitus 2
maculosus, Heptadecanthus 447
maeander, Choerops 32
magnilabris, Cheilolabrus 146
margaritaceus, Halichoeres 180, 216
margaritaceus, Julis 216
margaritaceus, Octocynodon 216
margaritaceus, Platyglossus 170
margaritaceus, Xenojulis 170
margaritiferus, Choerodon 31, 36
margaritophorus, Halichoeres 205
margaritophorus, Julis 205
margaritus, Callyodon 271, 313
margaritus, Pseudoscarus 313
marginatum, Tetradrachmum 465
marginatus, Abudefduf 407
marginatus, Dascyllus 445, 463, 465
marginatus, Halichoeres 178, 197, 200
marginatus, Julis 197
marginatus, Platyglossus 192, 197
marginatus, Pomacentrus 388, 465
marmoratus, Cirrhites 2
marmoratus, Cirrhitichthys 2
marmoratus, Cirrhitus 2
marmoratus, Labrus 2
mastax, Pseudoscarus 276
mastax, Scarus 276
mastax, var. of Pseudoscarus harid 276
meaco, Sparus 144
megalops, Pomacentrus 381
melanochir, Julis 137
melanochir, Pomacentrus 355, 379, 385
melanochir, Thalassoma 119, 122, 137
melanopleura, Cheilinus 84
melanopselion, Abudefduf 429

melanopterus, Hemigymnus 145
melanopterus, Pomacentrus 355, 380, 381
melanopterus, Pseudopomacentrus 380
melanopterus, Tautoga 145
melanopus, Abudefduf 397, 422
melanopus, Amphiprion 332, 337
melanopus, Glyphidodon 422
melanopus, Glyphisodon 422
melanopus, Hemipteronotus 55, 58
melanopus, Novacula 58
melanopus, Paraglyphidodon 422
melanopus, Prochilus 337
melanopus var. of Amphiprion melanopus 337
melanostigma, Choerodon 31, 38
melanotus, Gomphosus 115
melanotus, Pomacentrus 377
melanurus, Amphiprion 346
melanurus, Anampses 99, 103
melanurus, Dascyllus 463, 469
melanurus, Halichoeres 178, 195
melanurus, Julis 195
melanurus, Platyglossus 195
melanurus, Tetradrachmum 469
melapteronotus, Labrus 144
melapterus, Cheilolabrus 146
melapterus, Hemigymnus 143, 145
melapterus, Labrus 145
melapterus, Thalliurus 146
melapterus, Tautoga 145
melas, Abudefduf 397, 424
melas, Chrysiptera 408, 424
melas, Glyphidodon 424
melas, Glyphisodon 424
melas, Paraglyphidodon 424
meleagrides, Anampses 99, 102
meleagris, Choerops 31
meleagris, Halichoeres 172
meleagris, Julis 172
meleagris, Macropharyngodon 172
meleagris, Platyglossus 172
meniscus, Julis 133
mentalis, Cheilinus 76, 86
mentalis, Chilinus 86
mentalis, Scarus 311
mesothorax, Bodianus 42
mesothorax, Cossyphus 42
mesothorax, Labrus 42
mesothorax, Lepidaplois 42
metallicus, Abudefduf 413
microcheilos, Callyodon 275
microcheilos, Pseudoscarus 275
microcheilus, Callyodon 267, 275
microcheilus, Pseudoscarus 275
micrognathos, Scarus 306
microlepidotus, Xyrichthys 52
microrhinos, Callyodon 273
microrhinos, Pseudoscarus 273
microrhinos, Scarus 273
microrhinus, Callyodon 267, 273
microrhinus, Pseudoscarus 273
microstoma, Cheilio 109
Milii, Amphiprion 338
milii, Sparus 338
miniata, Choerojulis 214
miniatus, Halichoeres 180, 214
miniatus, Julis 214
miniatus, Octocynodon 214
miniatus, Platyglossus 214
modesta, Chrysiptera 437
modestus, Abudefduf 437
modestus, Glyphidodon 436
modestus, Glyphidodontops 436
modestus, Glyphisodon 436
modestus, Halichoeres 234
modestus, Iredaleichthys 437
modestus, Julis 234
modestus, Platyglossus 234
moensi, Callyodon 271, 322
Moensi, Pseudoscarus 322
Moensi, Scarus 322
mola, Halichoeres 207
mola, Julis 205, 207, 220
moluccanus, Odax 25
moluccanus, Pseudodax 25
moluccensis, Callyodon 262
moluccensis, Calotomus 263
moluccensis, Leptoscarus 263
moluccensis, Pomacentrus 355, 382
moluccensis, Pseudodax 25
moluccensis, Pseudopomacentrus 383
moresbyensis, Callyodon 269, 300
Moresbyensis, Pseudoscarus 300

morrisi, Oxycirrhites 16
mundicorpus, Iniistius 63
muricatus, Callyodon 268, 288, 313
muricatus, Pseudoscarus 288
muricatus, Scarus 288
mutabilis, Callyodon 271, 319, 321
mutabilis, Pseudoscarus 320
naevius, Scarichthys 257
naevius, Scarus 257
nebulosus, Halichoeres 180, 218
nebulosus, Julis 218
nebulosus, Platyglossus 218
Negostegastes dickii 442
Negostegastes lacrymatus 440
Negostegastes leucozona 441
nematoptera, Duymaeria 140
nematopterus, Crenilabrus 140
nematopterus, Duymaeria 140
nematopterus, Pomacentrus 369
nemurus, Glyphisodon 411
neoguinaicus, Anampses 99, 107
niger, Dascyllus 463
nigrescens, Halichoeres 179, 207
nigrescens, Labrus 207
nigricans, Eupomacentrus 358
nigricans, Holocentrus 357
nigricans, Pomacentrus 353, 357, 377, 393
nigricans, Scarus 311
nigrifrons, Glyphidodon 414
nigrifrons, Glyphisodon 414
nigromaculatus, Hemipteronotus 56
niveilatus, Xyrichthys 62
notatus, Abudefduf 395, 408
notatus, Choerops 34
notatus, Glyphidodon 408
notophthalmus, Cheilinus 93
notophthalmus, Halichoeres 177, 188, 207
notophthalmus, Hemitautoga 188
notophthalmus, Julis 207
notophthalmus, Platyglossus 188
notophthalmus, Pomacentrus 354, 377
notophthalmus, Tautoga 188
notopsis, Halichoeres 178, 199
notopsis, Julis 199
notopsis, Platyglossus 199
notostigma, Gomphosus 115
notostigmus, Pomacentrus 375
Novacula 54, 65
Novacula aneitensis 62
Novacula Arago 67
Novacula cephalotaenia 69
Novacula Hoedti 71
Novacula hoedtii 71
Novacula javanica 65
Novacula julioïdes 67
Novacula kallosoma 71
Novacula macrolepidota 67
Novacula melanopus 58
Novacula pavo 63
Novacula pentadactyla 57
Novacula praetextata 52
Novacula punctulata 57
Novacula sexmaculata 57
Novacula spilonotus 58
Novacula Stockumii 56
Novacula taeniurus 69
Novacula tetrazona 63
Novacula twisti 55
Novacula Twistii 55
Novacula vanicolensis 69
Novacula xyrichthyoides 52
Novaculichthys 18, 54, 66
Novaculichthys bifer 67, 71
Novaculichthys hemisphaerium 69
Novaculichthys kallosoma 71
Novaculichthys macrolepidotus 67
Novaculichthys taeniourus 69
Novaculichthys taeniurus 67, 69
novaculoïdes, Xyrichthys 52
nuchalis, Pomacentrus 463
nuchipunctatus, Callyodon 268, 283
nuchipunctatus, Pseudoscarus 283
nuchipunctatus, Scarus 283
obscurus, Pomacentrus 389
ocellaris, Amphiprion 346
ocellatus, Platyglossus 154
Octocynodon 175
Octocynodon margaritaceus 216
Octocynodon miniatus 214
octodon, Callyodon 314
octodon, Pseudoscarus 314
Odax moluccanus 25

ogos, Callyodon 292
oktodon, Callyodon 271, 314
oktodon, Pseudoscarus 314
oligacanthus, Choerodon 31, 39
oligacanthus, Choerops 39
oligacanthus, Crenilabrus 39
oligacanthus, Hypsigenys 39
oligacanthus, Macrochoerodon 39
ommopterus, Choerops 34
ommopterus, Cossyphus 34
ommopterus, Hypsigenys 34
onyx, Pomacentrus 469
ophthalmistius, Callyodon 267, 279
ophthalmistius, Scarus 279
opercularis, Chromis 456
opercularis, Halichoeres 216
opercularis, Platyglossus 216
orientalis, Cheilinus 86
ornatus, Gomphosus 113
ornatus, Thysanocheilus 153
oviceps, Callyodon 265, 270, 302
oviceps, Pseudoscarus 302
oviceps, Scarus 302
ovoides, Pomacentrus 363
oxycephalus, Abudefduf 397, 426
oxycephalus, Acanthocirrhitus 10
oxycephalus, Bodianus 42, 48
oxycephalus, Cheilinus 75, 78
oxycephalus, Chilinus 78
oxycephalus, Cirrhites 9
oxycephalus, Cirrhitus 10
oxycephalus, Cossyphus 48
oxycephalus, Harpe 49
oxycephalus, Lepidaplois 49
oxycephalus, Paraglyphidodon 426
oxycephalus, Verreo 49
Oxycirrhites 13
Oxycirrhites bimacula 13, 14
Oxycirrhites morrisi 16
Oxycirrhites typus 14, 15
oxyodon, Abudefduf 397, 428
oxyodon, Chrysiptera 428
oxyodon, Glyphidodon 428
oxyodon, Glyphisodon 428
oxyodon, Paraglyphidodon 428
oxyrhynchos, Cirrhitichthys 10
oxyrhynchos, Cirrhitus 10
oxyrhynchos, Julis 253
oxyrhynchus, Cheilinus 76, 91
palawanensis, Choerodon 39
pallidus, Abudefduf 446
pallidus, Glyphidodon 446
pallidus, Iredaleichthys 446
pantherinus, Amblycirrhitus 5
pantherinus, Cirrhites 5
pantherinus, Sparus 5
papilionaceus, Halichoeres, 179, 209
papilionaceus, Julis 209
Papuensis, Amphiprion 339
papuensis, Callyodon 269, 299
papuensis, Coris 249
papuensis, Pseudoscarus 299
Parabodianus 17, 50
Parabodianus rutteni 51
Paracirrhites 5
Paracirrhites amblycephalus 7
Paracirrhites arcatus 7
Paracirrhites forsteri 5
paradiseus, Labroides 148
Paraglyphidodon 393
Paraglyphidodon Behnii 422
Paraglyphidodon bonang 420
Paraglyphidodon melanopus 422
Paraglyphidodon melas 424
Paraglyphidodon oxycephalus 426
Paraglyphidodon oxyodon 428
Paraglyphidodon xanthonotus 426
Paraglyphidodon xanthurus 422
Paraplatyglossus prosopeion 222
Parapomacentrus 352
Parapomacentrus Bankieri 411
? Parapomacentrus polynema 385
parasema, Abudefduf 430
pardaleocephalus, Halichoeres 181, 223
pardaleocephalus, Julis 223
pardaleocephalus, Platyglossus 223
pardalis, Leptojulis 172
pavo, Chaetodon 385
pavo, Iniistius 63
pavo, Novacula 63
pavo, Pomacentrus 355, 385
pavo, Xyrichthys 63
pavoninus, Iniistius 64
pavoninus, Pomacentrus 385

pavoninus, Xyrichthys 63
pectoralis, Callyodon 268, 286
pectoralis, Gomphosus 114
pectoralis, Pseudoscarus 286
pectoralis, Scarus 286
Pellochromis 461
Pellochromis trimaculatus 463
Pellochromis xanthosoma 465
pentadactyla, Coryphaena 57
pentadactyla, Novacula 57
pentadactylum, Hemipteronotus 57
pentadactylus, Hemipteronotus 54, 57
pentazona, Pseudoscarus 320
Perca polymna 338, 342
percula, Actinicola 346
percula, Amphiprion 331, 332, 345, 348
percula, Lutjanus 345
percula, Prochilus 346
perideraeus, Amphiprion 332
perideraion, Amphiprion 331, 332, 348
perideraion, Prochilus 332
perspicillatus, Pomacentrus 354, 372, 379
phaiopus, Halichoeres 199
phaiopus, Julis 199
phaiotaenia, Halichoeres 186
phaiotaenia, Julis 186
Phalerebus 330
Phalerebus akallopisus 333
phekadopleura, Halichoeres 164
phekadopleura, Julis 164
phekadopleura, Stethojulis 156, 164
philippina, Wetmorella 82
philippinus, Abudefduf 414
philippinus, Callyodon 309
philippinus, Chromis 458
philippinus, Pomacentrus 354, 363
pinguirostratus, Scarus 274
pinnulatus, Cirrhitus 2
pinnulatus, Labrus 2
plagiometopon, Abudefduf 398, 424, 428
plagiometopon, Glyphidodon 428
plagiometopon, Glyphisodon 428
plagiometopon, Hemiglyphidodon 429
Platiglossus 175
Platyglossus 175
Platyglossus amboinensis 223
Platyglossus bicolor 205
Platyglossus bifasciatus 221
Platyglossus bilineatus 221
Platyglossus binotopsis 213
Platyglossus bivittatus 238
Platyglossus centiquadra 190
Platyglossus centriquadrus 190
Platyglossus chloropterus 233
Platyglossus chrysotaenia 202
Platyglossus Dayi 228
Platyglossus Doleschalli 209
Platyglossus dussumieri 207
Platyglossus flos-corallis 193
Platyglossus geoffroyi 172
Platyglossus guttatus 230
? Platyglossus guttulatus 235
Platyglossus gymnocephalus 234
Platyglossus hartzfeldii 228
Platyglossus Hoevenii 202
Platyglossus hortulanus 190
Platyglossus hyrtelii 221
Platyglossus hyrtlii 221
Platyglossus javanicus 236
Platyglossus kallochroma 193
Platyglossus kawarin 227
Platyglossus kneri 224
Platyglossus leparensis 211
Platyglossus margaritaceus 170
Platyglossus marginatus 192, 197
Platyglossus melanurus 195
Platyglossus meleagris 172
Platyglossus miniatus 214
Platyglossus modestus 234
Platyglossus nebulosus 218
Platyglossus notophthalmus 188
Platyglossus notopsis 199
Platyglossus ocellatus 154
Platyglossus opercularis 216
Platyglossus pardaleocephalus 223
Platyglossus podostigma 237
Platyglossus poecilus 218
Platyglossus prosopeion 222
Platyglossus pseudominiatus 216
Platyglossus purpurescens 192
Platyglossus Ransonneti 224
Platyglossus scapularis 186

Platyglossus schwarzii 209
Platyglossus solorensis 204
Platyglossus trilineatus 156, 226
Platyglossus trimaculatus 184
Platyglossus ubayensis 201
Platyglossus vrolickii 201
Platyglossus Vroliki 201
Platyglossus vrolikii 201
Platyglossus Xanti 210
podostigma, Halichoeres 183, 237
podostigma, Julis 237
podostigma, Platyglossus 237
poecila, Choerojulis 218
poecila, Halichoeres 218
poecila, Julis 218
poecilus, Halichoeres 218
poecilus, Platyglossus 218
polyacanthus, Acanthochromis 447
polyacanthus, Dascyllus 447
polyacanthus, Tetradrachmum 447
polyactis, Cirrhitichthys 9, 12
polylepis, Amphiprion 335
polylepis, Prochilus 335
polymna, Perca 338, 342
polymnus, Amphiprion 332, 342
polymnus, Anthia 338
polymnus, Prochilus 339
polymnus var., Anthias 345
polynema, Parapomacentrus 385
polynema, Pomacentrus 385
polyophthalmus, Halichoeres 230
polyophthalmus, Julis 230
Pomacentrus 327, 352, 380, 394, 414
? Pomacentrus albifasciatus 358
Pomacentrus albofasciatus 358, 372
Pomacentrus amboinensis 355, 387
Pomacentrus anabatoides 413, 455
? Pomacentrus analis 381
Pomacentrus annulatus 354, 368
Pomacentrus aruanus 467
Pomacentrus azysron 425
Pomacentrus bankanensis 388
Pomacentrus bankieri 411
Pomacentrus beauforti 369
Pomacentrus bifasciatus 354, 367
Pomacentrus bilineatus 389
Pomacentrus biocellatus 388
Pomacentrus brachialis 380
Pomacentrus breviceps 354, 364, 368
Pomacentrus burroughi 365
Pomacentrus caeruleus 385
Pomacentrus chrysopoecilus 354, 375
Pomacentrus chrysurus 392
Pomacentrus cyanomos 353, 360, 362
Pomacentrus cyanospilus 358
Pomacentrus delurus 389
Pomacentrus dimidiatus 389
Pomacentrus dorsalis 388
Pomacentrus emarginatus 388
Pomacentrus fasciatus 354, 373, 377
Pomacentrus fasciatus var. intermedia 375
Pomacentrus formosanus 349
Pomacentrus grammorhynchus 389
Pomacentrus hebardi 383
? Pomacentrus interorbitalis 372
Pomacentrus jerdoni 349
Pomacentrus kalunko 388
Pomacentrus labiatus 351
Pomacentrus leucopleura 358
Pomacentrus leucosphyrus 361
Pomacentrus littoralis 354, 364, 384, 389
Pomacentrus lividus 353, 356, 358, 393
Pomacentrus macleayi 390
Pomacentrus marginatus 388, 465
Pomacentrus megalops 381
Pomacentrus melanochir 355, 379, 385
Pomacentrus melanopterus 355, 380, 381
Pomacentrus melanotus 377
Pomacentrus moluccensis 355, 382
Pomacentrus nematopterus 369
Pomacentrus nigricans 353, 357, 377, 393
Pomacentrus nigromanus 355, 381
Pomacentrus notophthalmus 354, 377
Pomacentrus notostigmus 375
Pomacentrus nuchalis 463
Pomacentrus obscurus 389
Pomacentrus onyx 469
Pomacentrus ovoides 363
Pomacentrus pavo 355, 385
Pomacentrus pavoninus 385

Pomacentrus perspicillatus 354, 372, 379
Pomacentrus philippinus 354, 363
? Pomacentrus polynema 385
Pomacentrus pristiger 376
Pomacentrus prosopotaenia 354, 372
Pomacentrus prosopotaenioïdes 356
Pomacentrus punctatus 356
Pomacentrus rathbuni 362
Pomacentrus reidi 355, 384
Pomacentrus rectifraenum 393
Pomacentrus rhodonotus 392
? Pomacentrus scolopseus 357
Pomacentrus scolopsis 358
Pomacentrus scolopsis var. albofasciatus 358
Pomacentrus simsiang 388
Pomacentrus smithi 354, 366
Pomacentrus stigma 355, 379
Pomacentrus subniger 358
Pomacentrus suluensis 377
Pomacentrus taeniometopon 388
Pomacentrus taeniops 358, 388
Pomacentrus taeniurus 354, 361
Pomacentrus tapeinosoma 471
Pomacentrus trifasciatus 369
Pomacentrus trilineatus 388
Pomacentrus trimaculatus 370, 463
Pomacentrus tripunctatus 356, 388
Pomacentrus tropicus 383
Pomacentrus vanicolensis 388
Pomacentrus violascens 354, 362, 380
Pomacentrus wardi 390
porphyrocephalus, Julis 133
praetextata, Julis 52
praetextata, Novacula 52
praetextatus, Cymolutes 52
Premnas 327
Premnas biaculeatus 329
Premnas epigrammata 329
Premnas leudodesmus 329
Premnas semicinctus 329
Premnas trifasciatus 329
Premnas unicolor 329
pristiger, Pomacentrus 376
Pristotis 352
Pristotis fuscus 388
Pristotis trifasciatus 368
Pristotis violascens 362
Prochilus 330
Prochilus akallopisus 333
Prochilus bifasciatus 342
Prochilus ephippium 335
Prochilus macrostoma 337
Prochilus melanopus 337
Prochilus percula 346
Prochilus perideraion 332
Prochilus polylepis 335
Prochilus polymnus 339
Prochilus Rosenbergi 348
Prochilus Sebae 344
? Prochilus trifasciatus 342
Prochilus xanthurus 339
prosopeion, Halichoeres 180, 222
prosopeion, Julis 222
prosopeion, Paraplatyglossus 222
prosopeion, Platyglossus 222
prosopotaenia, Dischistodus 372
prosopotaenia, Pomacentrus 354, 372
prosopotaenioïdes, Pomacentrus 356
Pseudanampses 98
Pseudocheilinus 18, 96
Pseudocheilinus hexataenia 97
Pseudocheilinus psittaculus 97
Pseudochilinus hexataenia 97
Pseudocoris 20, 238
Pseudocoris heteropterus 239
Pseudodax 17, 25
Pseudodax moluccanus 25
Pseudodax moluccensis 25
Pseudojulis 20, 173
Pseudojulis girardi 174
Pseudojulis trifasciatus 175
pseudominiatus, Halichoeres 216
pseudominiatus Julis 216
pseudominiatus, Platyglossus 216
Pseudopomacentrus amboinensis 387
Pseudopomacentrus bankanensis 390
Pseudopomacentrus bilineatus 390
Pseudopomacentrus dimidiatus 389
Pseudopomacentrus littoralis 364
Pseudopomacentrus macleayi 390
Pseudopomacentrus melanopterus 380
Pseudopomacentrus moluccensis 383

Pseudopomacentrus reidi 384
Pseudopomacentrus stigma 379
Pseudopomacentrus trilineatus 389
Pseudopomacentrus Wardi 390
Pseudopomacentrus wardi macleayi 390
Pseudoscarus 265
Pseudoscarus abacurus 311
Pseudoscarus aeruginosus 300, 302
Pseudoscarus altipinnis 282
Pseudoscarus balinensis 300
Pseudoscarus bataviensis 323
Pseudoscarus bicolor 272
Pseudoscarus Cantori 304
? Pseudoscarus capistratoides 325
Pseudoscarus caudofasciatus 302
Pseudoscarus celebicus 311
Pseudoscarus chrysopoma 309
Pseudoscarus cyanognathos 286
Pseudoscarus cyanognathus 286
Pseudoscarus cyanotaenia 316
Pseudoscarus dimidiatus 289
Pseudoscarus dubius 301
Pseudoscarus Dussumieri 308
Pseudoscarus erythrodon 317
? Pseudoscarus flavomarginatus 284
Pseudoscarus Forsteni 294
Pseudoscarus forsteri 325
Pseudoscarus fraenatus 291
Pseudoscarus frenatus 290
Pseudoscarus frontalis 288
Pseudoscarus ghobbam 304
Pseudoscarus ghobban 304
Pseudoscarus godeffroyi 282
Pseudoscarus Goldiei 317
Pseudoscarus gymnognathus 316
Pseudoscarus harid 276
Pseudoscarus harid var. mastax 276
Pseudoscarus hypselopterus 293
Pseudoscarus janthochir 281
Pseudoscarus javanicus 292
Pseudoscarus Knerii 302
Pseudoscarus labiosus 300, 325
Pseudoscarus limbatus 284
Pseudoscarus longiceps 276
Pseudoscarus macrocheilos 303
Pseudoscarus macrochilus 304
Pseudoscarus margaritus 313
Pseudoscarus mastax 276
Pseudoscarus microcheilos 275
Pseudoscarus microcheilus 275
Pseudoscarus microrhinos 273
Pseudoscarus microrhinus 273
Pseudoscarus Moensi 322
Pseudoscarus Moresbyensis 300
Pseudoscarus muricatus 288
Pseudoscarus mutabilis 320
Pseudoscarus nuchipunctatus 283
Pseudoscarus octodon 314
Pseudoscarus oktodon 314
Pseudoscarus oviceps 302
Pseudoscarus papuensis 299
Pseudoscarus pentazona 320
Pseudoscarus pectoralis 286
Pseudoscarus pulchellus 277
Pseudoscarus pulchellus var. (?) bicolor 272
Pseudoscarus pyrrhostethus 304
Pseudoscarus Quoyi 318
Pseudoscarus rhoduropterus 315
Pseudoscarus rivulatus 306
Pseudoscarus ruberrimus 296
Pseudoscarus rubroviolaceus 296
Pseudoscarus cf. Sanctaecrucis 321
? Pseudoscarus scabriusculus 322
Pseudoscarus Schlegeli 320
Pseudoscarus schlegelii 320
Pseudoscarus singaporensis 280
Pseudoscarus singapurensis 280
Pseudoscarus sordidus 311
Pseudoscarus striatus 273
Pseudoscarus strongylocephalus 274
Pseudoscarus sumbanensis 316
Pseudoscarus Troscheli 311
Pseudoscarus Troschelii var. flavoguttata 311
Pseudoscarus variegatus 311
Pseudoscarus viridis 290, 309
Pseudoscarus wageënsis 257
Pseudoscarus xanthopleura 285
Pseudoscarus zonatus 278
psittaculus, Pseudocheilinus 97
psittacus, Scarus 304
Pteragogus 140

Pteragogus filamentosus 140
pterophthalmus, Anampses 99, 101
pulchellus, Callyodon 267, 277
pulchellus, Pseudoscarus 277
pulchellus, Scarus 277
pulchellus var. (?) bicolor, Pseudoscarus 272
pulcherrima, Coris 242
pulcherrima, Julis 243
punctatus, Cheilinus 76
punctatus, Pomacentrus 356
punctulata, Novacula 57
punctulatus, Cheilinus 76
purpurascens, Halichoeres 192
purpurea, Julis 125, 127, 129
purpurescens, Labrus 192
purpurescens, Platyglossus 192
purpureum, Thalassoma 118, 125, 127, 130
purpureus, Julis 127
purpureus, Scarus 127
pyrrhurus, Callyodon 311
pyrrhostethus, Pseudoscarus 304
pyrrostethus, Scarus 304
pyrrhogrammatoides, Halichoeres 183
pyrrhogrammatoides, Julis 183
pyrrhogrammatoides, Leptojulis 183
quadricolor, Julis 127, 129, 130
quadricolor, Thalassoma 127
quadrifasciatus, Glyphisodon 405
quadrimaculatus, Xiphocheilus 27, 29
quadrimaculatus, Xiphochilus 29
quinquecinctus, Cheilinus 76
quinquefasciatus, Scarus 144
quinquemaculatus, Hemipteronotus 57
quinquevittatus, Scarus 130
quinquevittatus, Thalassoma 130
quoyi, Callyodon 293, 318
Quoyi, Pseudoscarus 318
Quoyi, Scarus 309, 318
radiatus, Cheilinus 88
radiatus, Cheilio 88
radiatus, Chilinus 88
radiatus, Sparus 88
rahti, Glyphisodon 405
ramosus, Cheilio 109
Ransonneti, Platyglossus 224
rathbuni, Pomacentrus 362
rathi, Glyphisodon 410
rectifraenum, Pomacentrus 393
rectifrenum, Eupomacentrus 393
reichei, Halichoeres 218
Reichei, Julis 218
reidi, Pomacentrus 355, 384
reidi, Pseudopomacentrus 384
Renardi, Halichoeres 158
Renardi, Julis 158
renardi, Stethojulis 156, 158
reticulatum, Tetradrachmum 465
reticulatus, Chromis 455
reticulatus, Dascyllus 465
reticulatus, Heliases 465
retrofasciatus, Chromis 450, 461
rhodochrous, Cheilinus 76, 90
rhodonotus, Pomacentrus 392
rhodopterus, Scarus 315
rhoduropterus, Pseudoscarus 315
Rhytejulis albovittata 160
richmondi, Halichoeres 177, 195
rivulatoides, Scarus 306
rivulatus, Cheilinus 79
rivulatus, Pseudoscarus 306
rivulatus, Scarus 306
rosea, Julis 253
rosenbergi, Amphiprion 348
Rosenbergi, Prochilus 348
roseus, Heliastes 472
roseus, Zabulon 472
Rossi, Glyphisodon 436
rostratus, Callyodon 311
rostratus, Cheilinus 92, 94
rotundus, Chaetodon 404
rubellio, Ctenolabrus 140
rubellio, Duymaeria 140
ruberrimus, Callyodon 296
ruberrimus, Pseudoscarus 296
rubro-notatus, Scarus 259
rubroviolaceus, Callyodon 269, 296, 314
rubroviolaceus, Pseudoscarus 296
rubroviolaceus, Scarus 296
rufus, Labrus 42
ruppelii, Julis 247
Ruppelii, Scarus 276
Ruppellii, Julis 130

rutteni, Parabodianus 51
Sanctae-crucis, Pseudoscarus 321
sapphirus, Abudefduf 430, 432
sapphirus, Iredaleichthys 433
Sargus ensifer 329
saxatilis, Abudefduf 401, 403, 405, 410
saxatilis, Glyphidodon 405, 410
saxatilis, Glyphisodon 405, 410
saxatilis saxatilis, Abudefduf 405, 408
saxatilis vaigiensis, Abudefduf 395, 404, 408
scabriusculus, Pseudoscarus 322
scabriusculus, Scarus 322
scapularis, Choerojulis 186
scapularis, Güntheria 186
scapularis, Halichoeres 177, 186
scapularis, Julis 186
scapularis, Platyglossus 186
Scarichthys 256, 261
Scarichthys auritus 257, 262
Scarichthys Bottae 259
Scarichthys caeruleopunctatus 259
Scarichthys coeruleopunctatus 259
Scarichthys naevius 257
Scarichthys waigiensis 257
Scarus abacurus 311
Scarus aeruginosus 300
Scarus auritus 257
Scarus balinensis 300
Scarus bataviensis 323
Scarus Bennetti 300
Scarus bicolor 272
Scarus Blochii 309
Scarus Bottae 259
Scarus calus 296
? Scarus capistratoides 325
? Scarus capistratus 275
Scarus celebicus 311
? Scarus chlorodon 311
Scarus chrysopomus 309
Scarus coeruleo-punctatus 259
? Scarus cretensis 273
Scarus cyanognathus 286
Scarus cyanotaenia 316
Scarus dimidiatus 289
Scarus dubius 300
Scarus Dussumieri 308
Scarus erythrodon 316
Scarus fasciatus 306
Scarus formosus 286
Scarus forsteri 325
Scarus frenatus 290
Scarus gallus 133
Scarus ghobban 304
Scarus gilberti 323
Scarus gymnognathus 316
Scarus harid 276, 304
Scarus haridoïdes 304
Scarus hypselopterus 293
Scarus janthochir 281
Scarus javanicus 292
Scarus jenkinsi 323
Scarus latus 276
Scarus limbatus 283
Scarus longiceps 276
Scarus macrocheilos 303
Scarus mastax 276
? Scarus mentalis 311
Scarus micrognathos 306
Scarus microrhinos 273
Scarus Moensi 322
Scarus muricatus 288
Scarus naevius 257
? Scarus nigricans 311
Scarus nuchipunctatus 283
Scarus ophthalmistius 279
Scarus oviceps 302
Scarus pectoralis 286
? Scarus pinguirostratus 274
Scarus psittacus 304
Scarus pulchellus 277
Scarus purpureus 127
Scarus pyrrostethus 304
Scarus quinquefasciatus 144
? Scarus quinquevittatus 130
Scarus Quoyi 309, 318
Scarus rhodopterus 315
Scarus rivulatoïdes 306
Scarus rivulatus 306
Scarus rubro-notatus 259
Scarus rubroviolaceus 296
Scarus Ruppelii 276
? Scarus scabriusculus 322
Scarus schlegeli 321

Scarus singaporensis 280
Scarus sordidus 311
Scarus spinidens 261, 262
? Scarus striatus 273
Scarus strongylocephalus 274
Scarus sumbawensis 316
Scarus tricolor 295
Scarus troscheli 311
Scarus Troschelii 311
Scarus vaigiensis 257, 261
Scarus variegatus 311
Scarus viridescens 262
Scarus viridibusius 299
Scarus viridis 309
Scarus xanthopleura 285
Schlegeli, Pseudoscarus 320
schlegeli, Scarus 321
Schlegelii, Glyphidodon 414
schlegelii, Glyphisodon 414
schlegelii, Pseudoscarus 320
schoenleini, Choerodon 31, 34
schoenleinii, Choerodon 34, 36
Schoenleinii, Choerops 34
Schoenleinii, Cossyphus 34
schönlinii, Choerops 34
Schröderii, Halichoeres 249
Schröderii, Julis 249
Schwanefeldi, Julis 121
schwanefeldi, Thalassoma 118, 121
Schwarzi, Choerojulis 209
Schwarzi, Halichoeres 209
Schwarzii, Halichoeres 209
Schwarzii, Julis 209
schwarzii, Platyglossus 209
scolopseus, Pomacentrus 357
scolopsis, Pomacentrus 358
Scorpaena aculeata 329
scotochilopterus, Chromis 455
sebae, Amphiprion 332, 344
Sebae, Halichoeres 156
Sebae, Prochilus 344
Sebanus, Julis 156
Semachlorella bifer 71
semicinctus, Premnas 329
semicoeruleus, Julis 127
semidecorata, Julis 233
semidiscus, Hologymnosus 241, 253
semidiscus, Labrus 253
semifasciatus, Julis 122
semipunctatus, Julis 247
septemfasciatus, Abudefduf 395, 401
septemfasciatus, Glyphisodon 401
sexfasciata, Tautoga 144
sexfasciatus, Abudefduf 403, 405, 410
sexfasciatus, Halichoeres 144
sexfasciatus, Hemigymnus 144
sexfasciatus, Labrus 404, 409
sexmaculata, Novacula 57
simsiang, Pomacentrus 388
singaporensis, Callyodon 267, 280
singaporensis, Pseudoscarus 280
singaporensis, Scarus 280
singapurensis, Pseudoscarus 280
smithi, Pomacentrus 354, 366
snyderi, Callyodon 263
snyderi, Calotomus 263
solorensis, Cirrhilabrus 21
solorensis, Halichoeres 178, 204
solorensis, Julis 204
solorensis, Platyglossus 204
sonnerat, Holocentrus 329
sordidus, Abudefduf 395
sordidus, Callyodon 271, 311, 316, 320
sordidus, Chaetodon 399
sordidus, Glyphidodon 399
sordidus, Glyphisodon 399
sordidus, Pseudoscarus 311
sordidus, Scarus 311
souleyetii, Julis 125
Sparus anchorago 31
Sparus chlorurus 76, 143
Sparus decussatus 189
Sparus fasciatus 81
Sparus hardwickii 122
Sparus insidiator 73
Sparus meaco 144
Sparus milii 338
Sparus pantherinus 5
Sparus radiatus 88
Sparus zonephorus 144
spec, Thalassoma 134
spilogaster, Crenilabrus 140
spilogaster, Duymaeria 140
spilonotus, Hemipteronotus 58

spilonotus, Novacula 58
spilurus, Halichoeres 184
spilurus, Julis 184
spinidens, Callyodon 262
spinidens, Cryptotomus 261, 262
spinidens, Scarus 261, 262
Stegastes 393
Stegastes batjanensis 444
Stegastes Dickii 442
Stegastes lacrymatus 439
Stegastes leucozona 441
steindachneri, Chlorichthys 137
steindachneri, Thalassoma 137
Stethojulis 19, 155, 226
Stethojulis albovittata 156, 159
Stethojulis axillaris 156, 167
Stethojulis bandanensis 167
Stethojulis casturi 159
Stethojulis interrupta 156, 161
Stethojulis kallosoma 165
Stethojulis kalosoma 156, 165
Stethojulis phekadopleura 156, 164
Stethojulis renardi 156, 158
Stethojulis strigiventer 156, 163
Stethojulis terina 166
Stethojulis trilineata 156, 161
Stethojulis zatima 166
stigma, Pomacentrus 355, 379
stigma, Pseudopomacentrus 379
stockumi, Hemipteronotus 54, 56
Stockumii, Novacula 56
striatus, Pseudoscarus 273
striatus, Scarus 273
strigiventer, Halichoeres 163
strigiventer, Julis 163
strigiventer, Stethojulis 156, 163
strongylocephalus, Callyodon 267, 274
strongylocephalus, Pseudoscarus 274
strongylocephalus, Scarus 274
subniger, Pomacentrus 358
subniger var. of Eupomacentrus nigricans 358
suluensis, Pomacentrus 377
sumbawensis, Pseudoscarus 316
sumbawensis, Scarus 316
taeniatus, Anampses 104
taeniatus, Coris 253
taeniatus, Hologymnosus 253
taeniometopon, Pomacentrus 388
taenionotus, Labrus 67
taeniops, Pomacentrus 358, 388
taeniourus, Labrus 69
taeniourus, Novaculichthys 69
taeniurus, Novacula 69
taeniurus, Novaculichthys 67, 69
taeniurus, Pomacentrus 354, 361
taeniurus, Xyrichthys 69
tankervillae, Gerranus 5
tapeinosoma, Lepidozygus 471
tapeinosoma, Pomacentrus 471
Tautoga dimidiatus 145
Tautoga fasciata 144
Tautoga leucomus 144
Tautoga melanopterus 145
Tautoga melapterus 145
Tautoga notophthalmus 188
Tautoga sexfasciata 144
temmincki, Cirrhilabrus 21, 22
Temmincki, Halichoeres 192
Temmincki, Julis 192
terina, Stethojulis 166
ternatensis, Abudefduf 415
ternatensis, Amblyglyphidodon 414
ternatensis, Chromis 450, 458
ternatensis, Glyphisodon 414
ternatensis, Heliases 458
ternatensis, Heliastes 458
Tetradrachmum 461
Tetradrachmum arcuatum 467
Tetradrachmum aruanum 467
Tetradrachmum marginatum 465
Tetradrachmum melanurus 469
Tetradrachmum polyacanthus 447
Tetradrachmum reticulatum 465
Tetradrachmum trimaculatum 463
Tetradrachmum xanthosoma 465
Tetradrachmum xanthurus 362
tetrazona, Cheilinus 79
tetrazona, Iniistius 64
tetrazona, Novacula 63
tetrazona, Xyrichthys 63
Thalassoma 18, 117
Thalassoma amblycephalus 119, 136
Thalassoma berendti 127

Thalassoma cupido 119, 132
Thalassoma dorsale 122
Thalassoma duperreyi 139
Thalassoma fuscum 118, 126, 129
Thalassoma genivittatus 138
Thalassoma guntheri 130
Thalassoma güntheri 119, 126, 130, 133
Thalassoma hardwicke 123
Thalassoma hardwicki 118, 122
Thalassoma hebraicum 138
Thalassoma immanis 127
Thalassoma janseni 118, 119
Thalassoma jansenii 119
Thalassoma lunare 119, 133
Thalassoma lunaris 133
Thalassoma lutescens 138, 252
Thalassoma melanochir 119, 122, 137
Thalassoma purpureum 118, 125, 127, 130
Thalassoma quadricolor 127
Thalassoma quinquevittatus 130
Thalassoma schwanefeldi 118, 121
Thalassoma spec 134
Thalassoma steindachneri 137
Thalassoma trilobata 129
Thalassoma umbrostigma 118, 125, 129, 130, 132
Thalliurus 143
Thalliurus chlorurus 76
Thalliurus fasciatus 144
Thalliurus melapterus 146
thoracotaeniatus, Abudefduf 396, 420
thoracotaeniatus, Glyphidodontops 420
Thysanocheilus 152
Thysanocheilus cyanotaenia 153
Thysanocheilus ornatus 153
timorensis, Halichoeres 181, 225
timorensis, Julis 225
torquatus, Xyrichthys 52
tricolor, Amphiprion 335
tricolor, Callyodon 269, 294, 295
tricolor, Gomphosus 112
tricolor, Scarus 295
tricolor, var. of Amphiprion ephippium 335
trifasciatus, Amblyglyphidodon 414
trifasciatus, Amphiprion 342
trifasciatus, Glyphidodon 414
trifasciatus, Glyphisodon 414
trifasciatus, Lutjanos 329
trifasciatus, Pomacentrus 369
trifasciatus, Premnas 329
trifasciatus, Pristotis 368
trifasciatus, Prochilus 342
trifasciatus, Pseudojulis 175
trilineata, Stethojulis 156, 161
trilineatus, Labrus 156, 226
trilineatus, Platyglossus 156, 226
trilineatus, Pomacentrus 388
trilineatus, Pseudopomacentrus 389
trilobata, Julis 127, 129
trilobata, Thalassoma 129
trilobata var. α, Julis 129
trilobata var. β, Julis 127
trilobatus, Cheilinus 75, 79
trilobatus, Chilinus 79
trilobatus, Julis 129
trilobatus, Labrus 129
trimaculata, Choerojulis 184
trimaculata, Güntheria 184
trimaculata, Julis 184
trimaculatum, Tetradrachmum 463
trimaculatus, Dascyllus 462, 463
trimaculatus, Dischistodus 371
trimaculatus, Halichoeres 177, 184
trimaculatus, Julis 67
trimaculatus, Pellochromis 463
trimaculatus, Platyglossus 184
trimaculatus, Pomacentrus 370, 463
tripunctatus, Pomacentrus 356, 388
tropicus, Pomacentrus 383
Troscheli, Pseudoscarus 311
troscheli, Scarus 311
Troschelii, Scarus 311
tunicatus, Amphiprion 346
twisti, Anampses 107
twisti, Hemipteronotus 54, 55
twisti, Novacula 55
twistii, Anampses 99, 107
Twistii, Hemipteronotus 55
Twistii, Novacula 55
typus, Oxycirrhites 14, 15
typus, Xiphocheilus 27
tyrrwhitti, Chaetodon 405

ubayensis, Platyglossus 201
ultramarinus, Callyodon 273
umbrostigma, Julis 125
umbrostigma, Thalassoma 118, 125, 129, 130, 132
umbrostygma, Julis 125
undulatus, Cheilinus 75, 83
undulatus, Chilinus 83
undulatus, Gomphosus 115
unicolor, Premnas 329
unifasciatus, Cheilinus 88, 90
unifasciatus, Glyphidodon 442
unimaculatus, Abudefduf 437
unimaculatus, Amphiprion 342
unimaculatus, Cossyphus 48
unimaculatus, Glyphidodon 436
unimaculatus, Glyphidodontops 436
unimaculatus, Glyphisodon 436
uniocellatus, Glyphidodontops 431
uniocellatus, Glyphisodon 431
upolensis, Callyodon 296
urostigma, Julis 122
vaigiensis, Calliodon 261
vaigiensis, Calotomus 263
vaigiensis, Glyphisodon 404
vaigiensis, Leptoscarus 257, 260, 263
vaigiensis, Scarus 257, 261
vanicolensis, Novacula 69
vanicolensis, Pomacentrus 388
vanicolensis, Xyrichthys 69
vanikorensis, Julis 69
var. Dascyllus aruanus 469
variegata, Coris 242, 247, 249
variegatus, Halichoeres 249
variegatus, Hemicoris 249
variegatus, Julis 249
variegatus, Pseudoscarus 311
variegatus, Scarus 311
varius, Gomphosus 112, 114
vermiculatus, Callyodon 268, 282
Verreo 41
Verreo oxycephalus 49
verweyi, Callyodon 269, 298
violaceus, Pomacentrus 354, 362
violascens, Pomacentrus 380
violascens, Pristotis 362
viridescens, Leptoscarus 263
viridescens, Scarus 262
viridibusius, Callyodon 269, 299
viridibusius, Scarus 299
viridis, Cheilio 109
viridis, Gomphosus 113
viridis, Pseudoscarus 309
viridis, Scarus 309
vitta, Choerodon 31, 38
vroliki, Halichoeres 178, 201
Vroliki, Julis 201
Vroliki, Platyglossus 201
vrolikii, Platyglossus 201
wagëensis, Pseudoscarus 257
waigiensis, Callyodon 262
waigiensis, Glyphidodon 405
waigiensis, Glyphisodon 405
waigiensis, Scarichthys 257
wardi macleayi, Pseudopomacentrus 390
wardi, Pomacentrus 390
weberi, Choerodon 32
weberi, Chromis 455
Westermani, Glyphidodon 368
Wetmorella philippina 82
xanthochir, Chromis 450, 455
xanthochir, Heliases 455
xanthochir, Heliastes 455
xanthonotus, Abudefduf 397, 426
xanthonotus, Chrysiptera 427
xanthonotus, Glyphisodon 426
xanthonotus, Paraglyphidodon 426
xanthopleura, Callyodon 268, 285
xanthopleura, Pseudoscarus 285
xanthopleura, Scarus 285
xanthosoma, Dascyllus 465
xanthosoma, Pellochromis 465
xanthosoma, Tetradrachmum 465
xanthozona, Abudefduf 398, 434, 444
xanthozona, Glyphidodon 434
xanthozona, Glyphisodon 434
xanthura, Chrysiptera 422
xanthurus, Abudefduf 422
xanthurus, Amphiprion 338
xanthurus, Chromis 411, 450, 456, 460
xanthurus, Dascyllus 362
xanthurus, Diproctacanthus 151
xanthurus, Diproktacanthus 151

xanthurus, Glyphidodon 422
xanthurus, Glyphisodon 422
xanthurus, Heliases 456
xanthurus, Labroides 151
xanthurus, Paraglyphidodon 422
xanthurus, Prochilus 339
xanthurus, Tetradrachmum 362
xanthurus var. of Amphiprion ephippium 339
xanti, Halichoeres 179, 210
Xanti, Platyglossus 210
Xenojulis 19, 169
Xenojulis margaritaceus 170
Xiphocheilus 17, 26
Xiphocheilus quadrimaculatus 27, 29
Xiphocheilus typus 27
xiphochilus quadrimaculatus 29
xyrichthyoides, Novacula 52
Xyrichthys 18, 65
Xyrichthys Arago 67
Xyrichthys javanicus 65
Xyrichthys lecluse 52
Xyrichthys macrolepidotus 67
Xyrichthys microlepidotus 52
Xyrichthys niveilatus 62
Xyrichthys novaculoïdes 52
Xyrichthys pavo 63
Xyrichthys pavoninus 63
Xyrichthys taeniurus 69
Xyrichthys tetrazona 63
Xyrichthys torquatus 52
Xyrichthys vanicolensis 69
Zabulon 327, 471
Zabulon roseus 472
zatima, Stethojulis 166
zonatus, Abudefduf 437
zonatus, Callyodon 267, 278
zonatus, Glyphidodontops 436
zonatus, Glyphisodon 436
zonatus, Pseudoscarus 278
zonatus var. of Abudefduf Brownriggii 437
zonephorus, Sparus 144
zonularis, Callyodon 302
zonurus, Cheilinus 90
zosterophorus, Choerodon 31, 36
zosterophorus, Choerops 36, 38
zosterophorus, Cossyphus 46